TOYOTOMI

Service Manual

MODEL:
TAN/TAG-A16HDI

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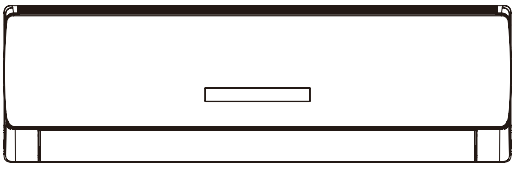
Summary and Features

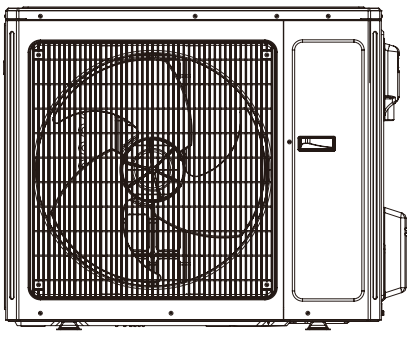
Indoor Unit

TAN-A16 HDI



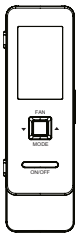
Outdoor Unit

TAG-A16 HDI



Remote Controller

YAG1FB



1. Safety Precautions

Installing, starting up, and servicing air conditioner can be hazardous due to system pressure, electrical components, and equipment location, etc.

Only trained, qualified installers and service personnel are allowed to install, start-up, and service this equipment. Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel.

When handling the equipment, observe precautions in the manual and on tags, stickers, and labels attached to the equipment. Follow all safety codes. Wear safety glasses andwork gloves. Keep quenching cloth and fire extinguisher nearby when brazing.

Read the instructions thoroughly and follow all warnings or cautions in literature and attached to the unit. Consult local building codes and current editions of national as well as local electrical codes.

Recognize the following safety information:

⚠ Warning	Incorrect handling could result in personal injury or death.
⚠ Caution	Incorrect handling may result in minor injury,or damage to product or property.

⚠ Warning

All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.

- Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.
- Never supply power to the unit unless all wiring and tubing are completed, reconnected and checked.
- This system adopts highly dangerous electrical voltage. Incorrect connection or inadequate grounding can cause personal injury or death. Stick to the wiring diagram and all the instructions when wiring.
- Have the unit adequately grounded in accordance with local electrical codes.
- Have all wiring connected tightly. Loose connection may lead to overheating and a possible fire hazard.

All installation or repair work shall be performed by your dealer or a specialized subcontractor as there is the risk of fire, electric shock, explosion or injury.

⚠ Caution

- Never install the unit in a place where a combustible gas might leak, or it may lead to fire or explosion.
- Make a proper provision against noise when the unit is installed at a telecommunication center or hospital.
- Provide an electric leak breaker when it is installed in a watery place.
- Never wash the unit with water.
- Handle unit transportation with care. The unit should not be carried by only one person if it is more than 20kg.
- Never touch the heat exchanger fins with bare hands.
- Never touch the compressor or refrigerant piping without wearing glove.
- Do not have the unit operate without air filter.
- Should any emergency occur, stop the unit and disconnect the power immediately.
- Properly insulate any tubing running inside the room to prevent the water from damaging the wall.

- Make sure the outdoor unit is installed on a stable, level surface with no accumulation of snow, leaves, or trash beside.
- Make sure the ceiling/wall is strong enough to bear the weight of the unit.
- Make sure the noise of the outdoor unit does not disturb neighbors.
- Follow all the installation instructions to minimize the risk of damage from earthquakes, typhoons or strong winds.
- Avoid contact between refrigerant and fire as it generates poisonous gas.
- Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture and other hazards.
- Make sure no refrigerant gas is leaking out when installation is completed.
- Should there be refrigerant leakage, the density of refrigerant in the air shall in no way exceed its limited value, or it may lead to explosion.
- Keep your fingers and clothing away from any moving parts.
- Clear the site after installation. Make sure no foreign objects are left in the unit.
- Always ensure effective grounding for the unit.

2. Specifications

2.1 Unit Specifications

Model			**TAN/TAG-A16 HDI**
Product Code			1.CB412000300 2.CB411000300
Power Supply	Rated Voltage	V ～	220-240
	Rated Frequency	Hz	50/60
	Phases		1
Power Supply Mode			Indoor
Cooling Capacity (Min ～ Max)		W	5300(850 ～ 6750)
Heating Capacity (Min ～ Max)		W	5600(1050 ～ 7300)
Cooling Power Input (Min ～ Max)		W	1470(320 ～ 2500)
Heating Power Input (Min ～ Max)		W	1520(320 ～ 2500)
Cooling Power Current		A	7
Heating Power Current		A	7
Rated Input		W	2500
Rated Current		A	12.08
Air Flow Volume(SH/H/MH/M/ML/L/SL)		m^3/h	950/870/790/710/630/560/480
Dehumidifying Volume		L/h	1.8
EER		W/W	3.66
COP		W/W	3.81
Application Area		m^2	23-34
Indoor Unit	Model of indoor unit		TAN-A16 HDI
	Fan Type		Cross-flow
	Diameter Length(DXL)	mm	Φ100X765
	Fan Motor Cooling Speed (SH/H/MH/M/ML/L/SL)	r/min	1250/1150/1050/950/850/750/650
	Fan Motor Heating Speed (SH/H/MH/M/ML/L/SL)	r/min	1300/1200/1100/1000/900/800/700
	Output of Fan Motor	W	25
	Fan Motor RLA	A	0.11
	Fan Motor Capacitor	μF	/
	Input of Heater	W	/
	Evaporator Form		Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7
	Row-fin Gap	mm	2-1.5
	Coil Length (LXDXW)	mm	765X25.4X342.9
	Swing Motor Model		MP28VC/MP24AA
	Output of Swing Motor	W	2/1.5
	Fuse	A	3.15
	Sound Pressure Level (SH/H/MH/M/ML/L/SL)	dB (A)	49/44/41/39/36/33/30
	Sound Power Level (SH/H/MH/M/ML/L/SL)	dB (A)	59/54/51/49/46/43/40
	Dimension (WXHXD)	mm	1018X319X230
	Dimension of Carton Box (LXWXH)	mm	1094X394X325
	Dimension of Package (LXWXH)	mm	1097X397X340
	Net Weight	kg	15
	Gross Weight	kg	20

The above data is subject to change without notice. Please refer to the nameplate of the unit.

Outdoor Unit	Outdoor Unit Model	--	TAG-A16HDI
	Compressor Trademark		MITSUBISHI
	Compressor Manufacturer	--	MITSUBISHI ELECTRIC <GUANGZHOU>COMP
	Compressor Model	--	SNB130FGYMC-L1
	Compressor Oil	--	FV50S
	Compressor Type	--	Rotary
	Compressor LRA.	A	27.00
	Compressor RLA	A	8.40
	Compressor Power Input	W	1245
	Compressor Overload Protector	--	1NT11L-6578
	Fan Type	--	Axial-flow
	Fan Diameter	mm	¢ 520
	Fan Motor Speed	rpm	700 / 500
	Fan Motor Power Output	W	60
	Fan Motor RLA	A	/
	Fan Motor Capacitor	μF	/
	Outdoor Unit Air Flow Volume	m3/h	3200
	Condenser Form	--	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	mm	φ7
	Condenser Rows-fin Gap	mm	3-1.4
	Condenser Coil Length (L×D×W)	mm	823.5×649×38.1
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5
	Maximum Allowable Pressure	MPa	4.3
	Cooling Operation Ambient Temperature Range	℃	10～48
	Heating Operation Ambient Temperature Range	℃	-15～24
	Throttling Method	--	Electron expansion valve
	Defrosting Method	--	Automatic Defrosting
	Climate Type	--	T1
	Isolation	--	I
	Moisture Protection	--	IP24
	Sound Pressure Level	dB (A)	56/50
	Sound Power Level	dB (A)	66/60
	Dimension (W×H×D)	mm	955 ×700×396
	Dimension of Carton Box (L×W×H)	mm	1026×455×735
	Dimension of Package(L×W×H)	mm	1029×458×750
	Net Weight	kg	50.0
	Gross Weight	kg	55.0
	Refrigerant	--	R410A
	Refrigerant Charge	kg	1.60
Connection Pipe	Length	m	5
	Gas Additional Charge	g/m	50
	Outer Diameter Liquid Pipe	mm	φ6
	Outer Diameter Gas Pipe	mm	φ16
	Max Distance Height	m	10
	Max Distance Length	m	25

2.4 Operation Data

Cooling

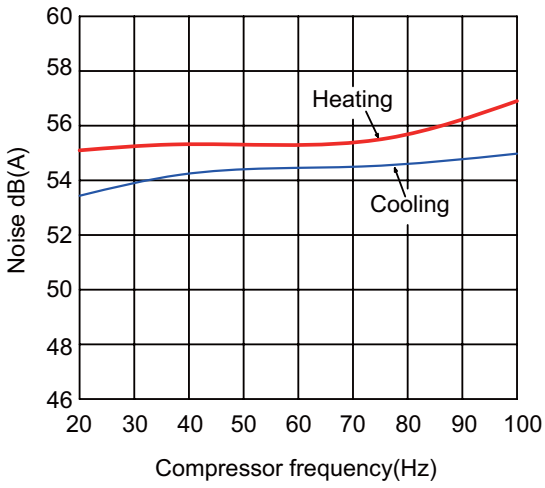
Temperature condition (°C)		Model name	Standard pressure	Heat exchanger pipe temp.		Indoor fan mode(rpm)	Outdoor fan mode(rpm)	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			
27/19	35/24	18K	0.9~1.0	in:8~11 out:11~14	in:75~83 out:37~48	1250	700	75
27/19	35/24	24K	0.9~1.0	in:8~11 out:11~14	in:75~83 out:37~48	1400	780	75

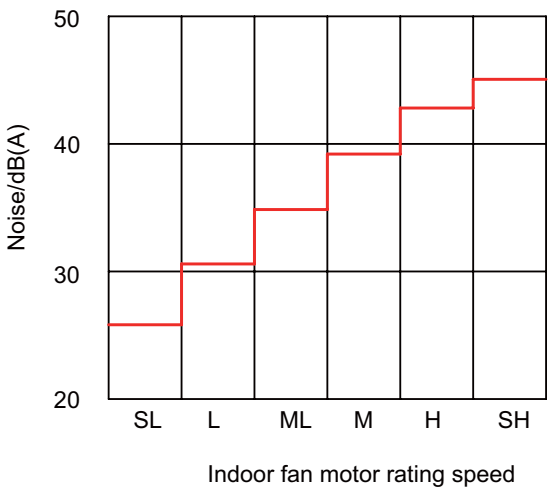
Heating

Temperature condition (°C)		Model name	Standard pressure	Heat exchanger pipe temp.		Indoor fan mode (rpm)	Outdoor fan mode (rpm)	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			
20/15	7/6	18K	2.2~2.4	in:75~83 out:37~45	in:1~3 out:2~6	1300	700	75
20/15	7/6	24K	2.2~2.4	in:75~83 out:37~45	in:1~3 out:2~6	1400	780	75

NOTES :
(1) T1: Inlet and outlet pipe temperature of evaporator
T2: Inlet and outlet pipe temperature of condenser
P: Pressure of air pipe connecting indoor and outdoor units(on the side of gas pipe)
(2) Measure surface temperature of heat exchanger pipe around center of heat exchanger path U bent. (Thermistor themometer)
(3) Connecting piping condition : 5 m

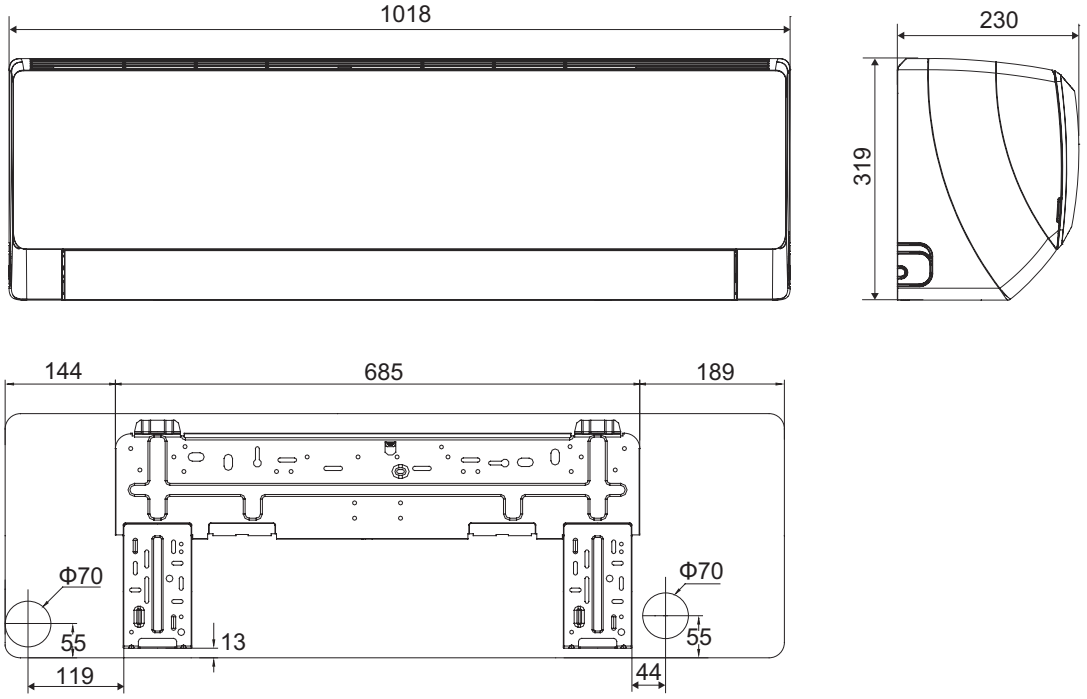
2.5 Noise Criteria Curve Tables





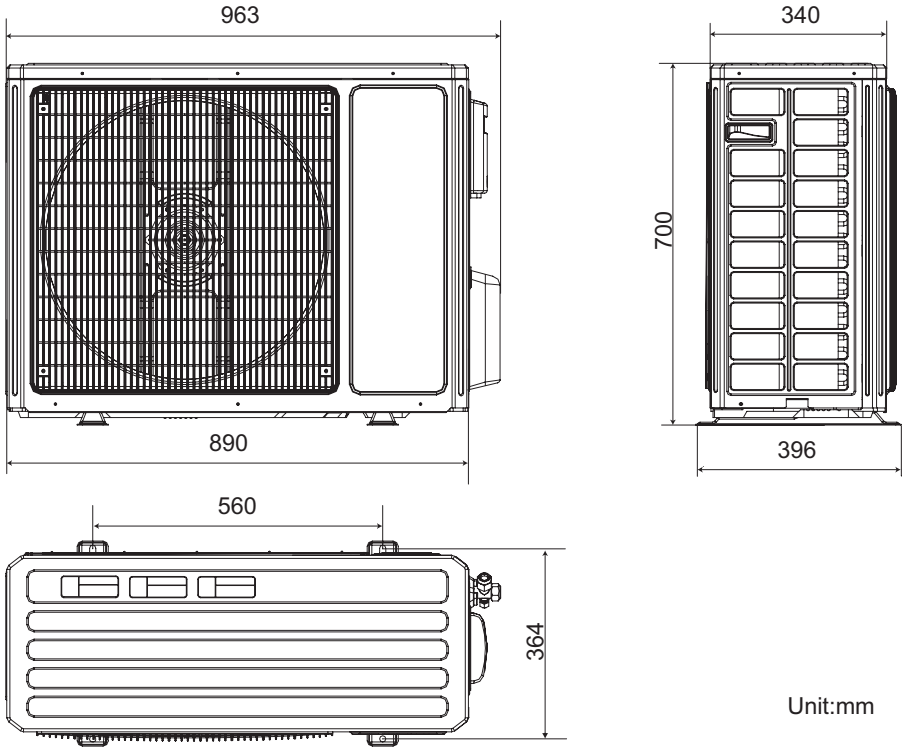
3. Construction Views

3.1 Indoor Unit TAN-A16 HDI



Unit:mm

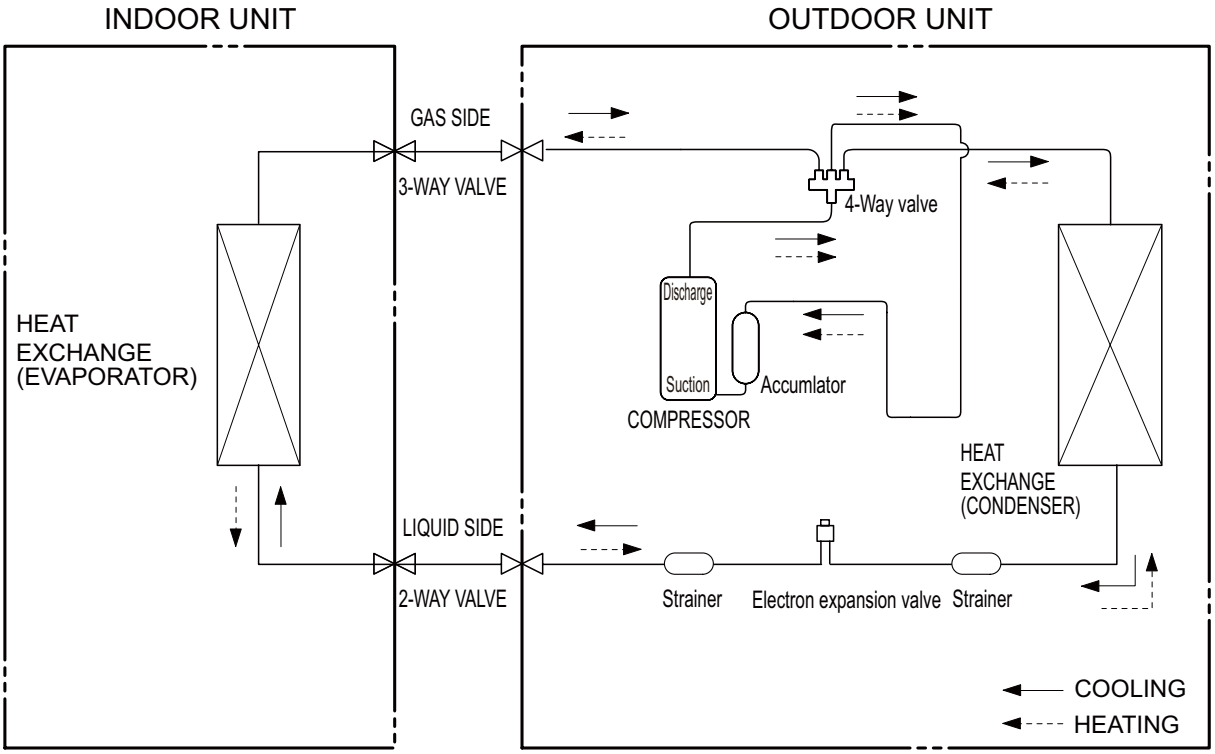
3.2 Outdoor Unit TAG-A16 HDI



Unit:mm

4. Refrigerant System Diagram

Cooling & Heating Models



Refrigerant pipe diameter
Liquid : 1/4" (6mm)
Gas : 5/8" (16mm)

5. Schematic Diagram

5.1 Electrical Data

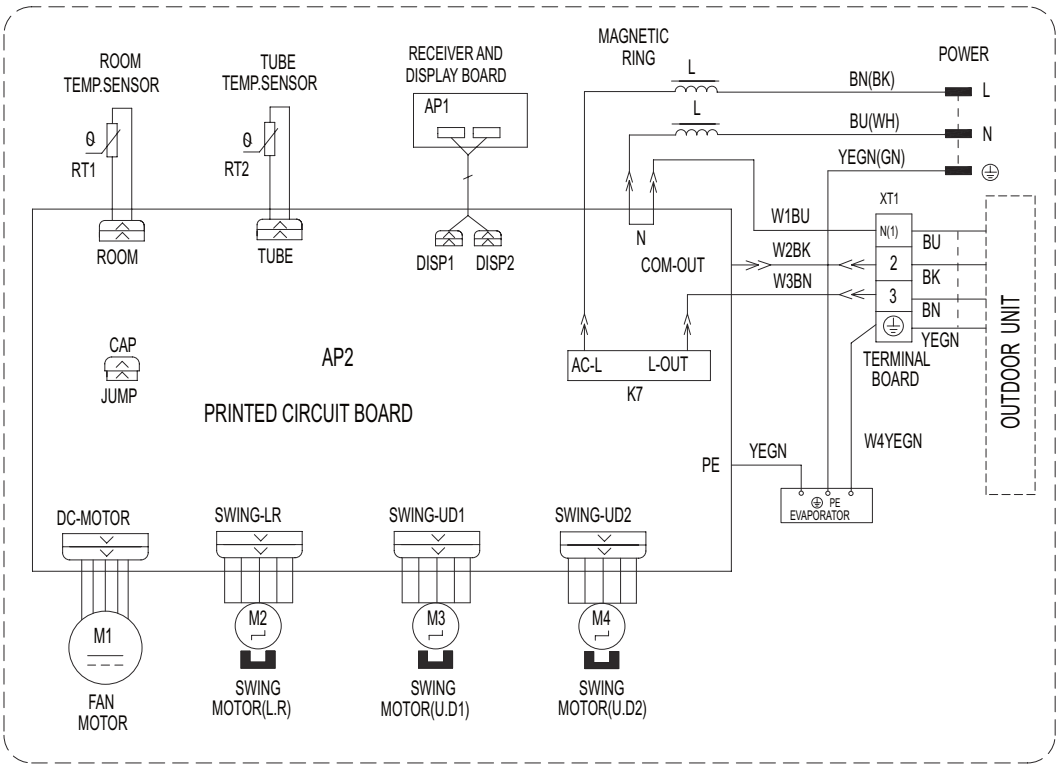
Meaning of marks

Symbol	Color symbol	Symbol	Color symbol	Symbol	Parts name
WH	WHITE	**GN**	GREEN	**SAT**	OVERLOAD
YE	YELLOW	**BN**	BROWN	**COMP**	COMPRESSOR
RD	RED	**BU**	BLUE	⏚	PROTECTIVE EARTH
YEGN	YELLOW GREEN	**BK**	BLACK	/	/
VT	VIOLET	**OG**	ORANGE	/	/

5.2 Electrical Wiring

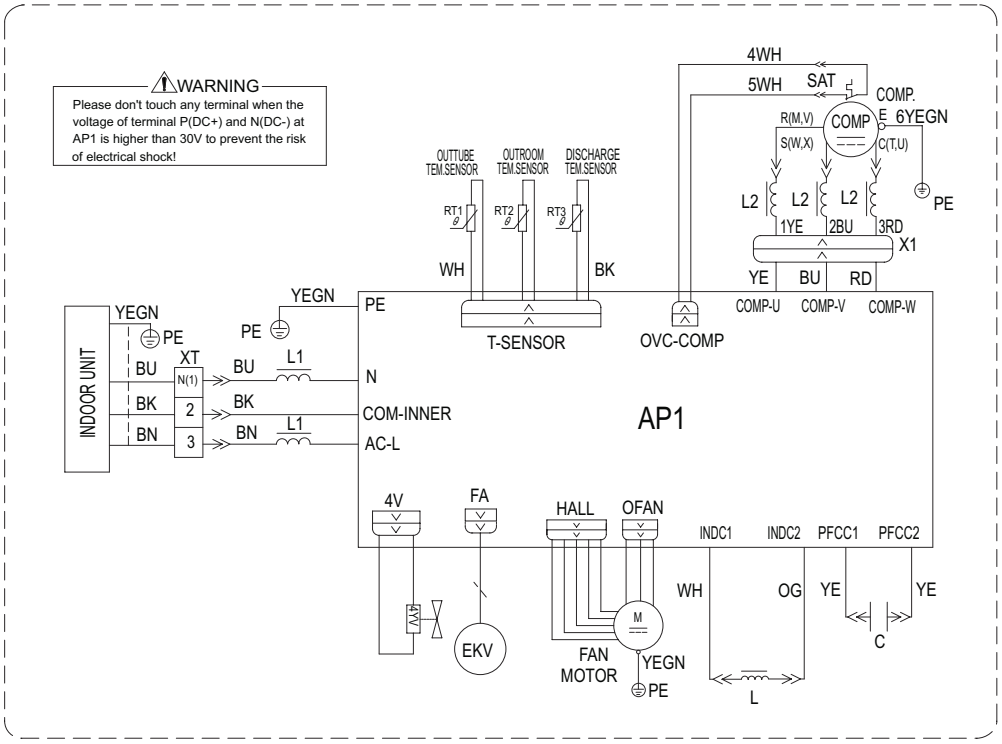
- **Indoor Unit**

TAN-A16 HDI



● Outdoor Unit

TAN-A16 HDI

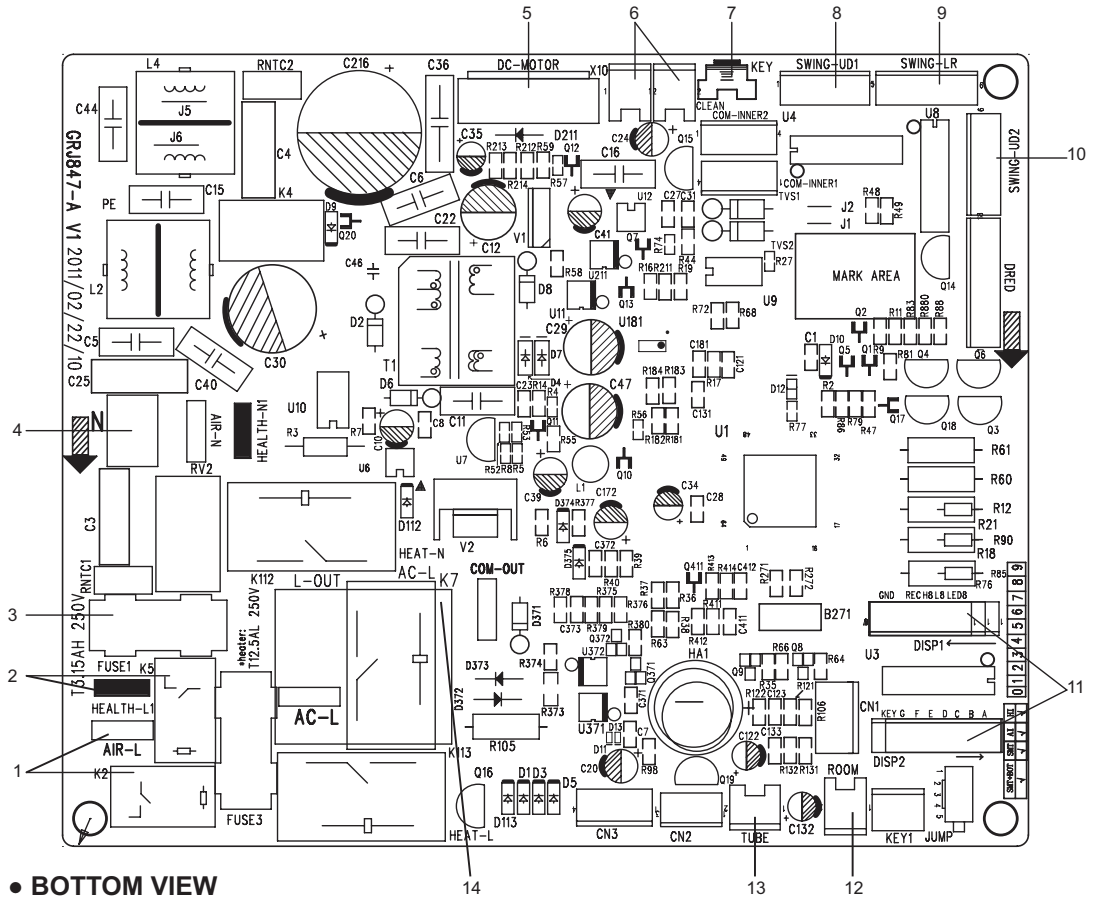


These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

5.3 Printed Circuit Board

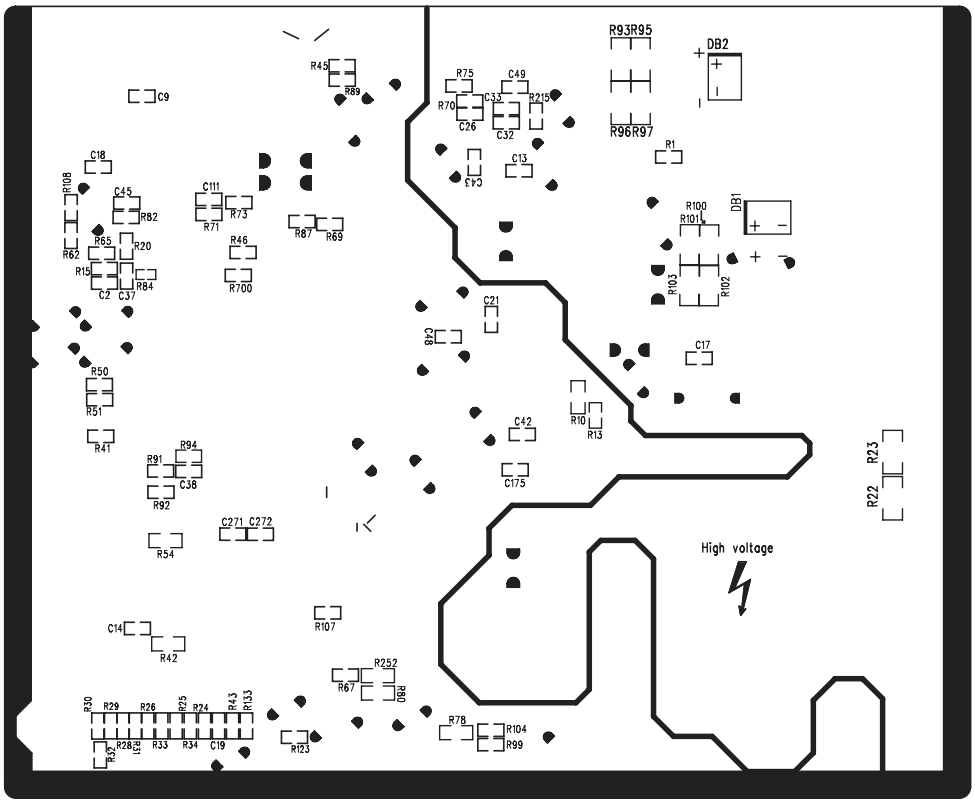
Indoor Unit

● TOP VIEW



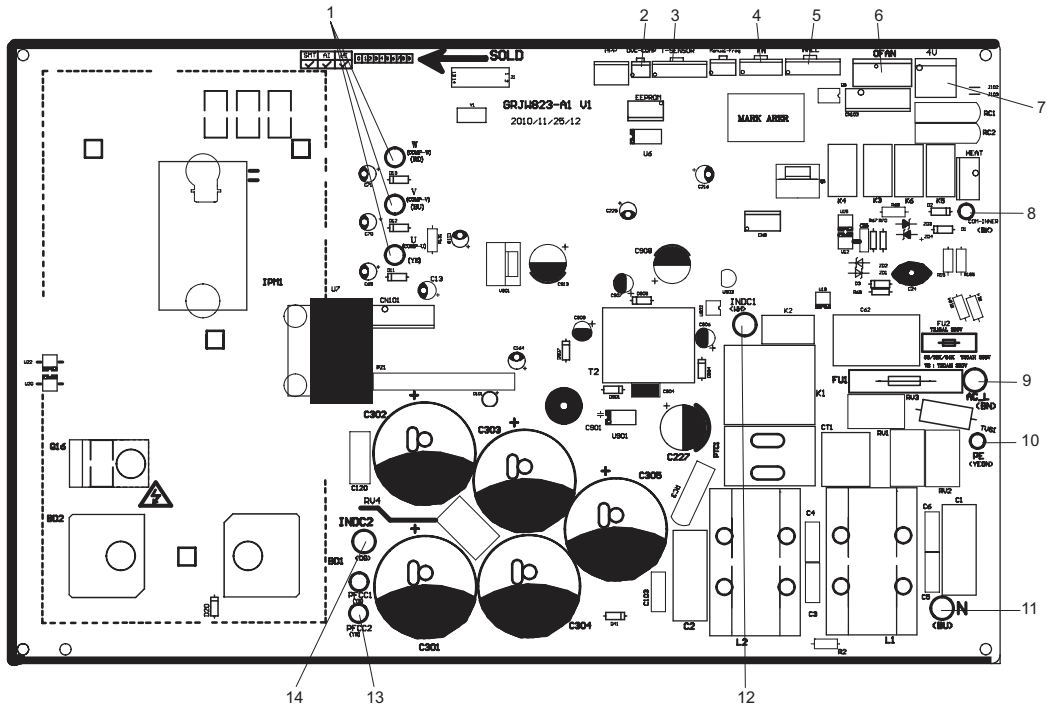
1	Independent ventilated control relay K2 and terminal
2	Healthy controller relay K5 and terminal
3	Fuse
4	Power neutral wire interface
5	Internal fan motor control interface
6	Static dedusting control interface
7	Auto button
8	Up&down swing (small louver guide) control interface
9	Left&right swing control interface
10	Up&down swing (big louver guide) controller interface
11	Display controller interface DISP1,DISP2
12	Ambient temp. sensor interface
13	Tube temp. sensor interface
14	Outdoor unit power supply control relay K7

● BOTTOM VIEW



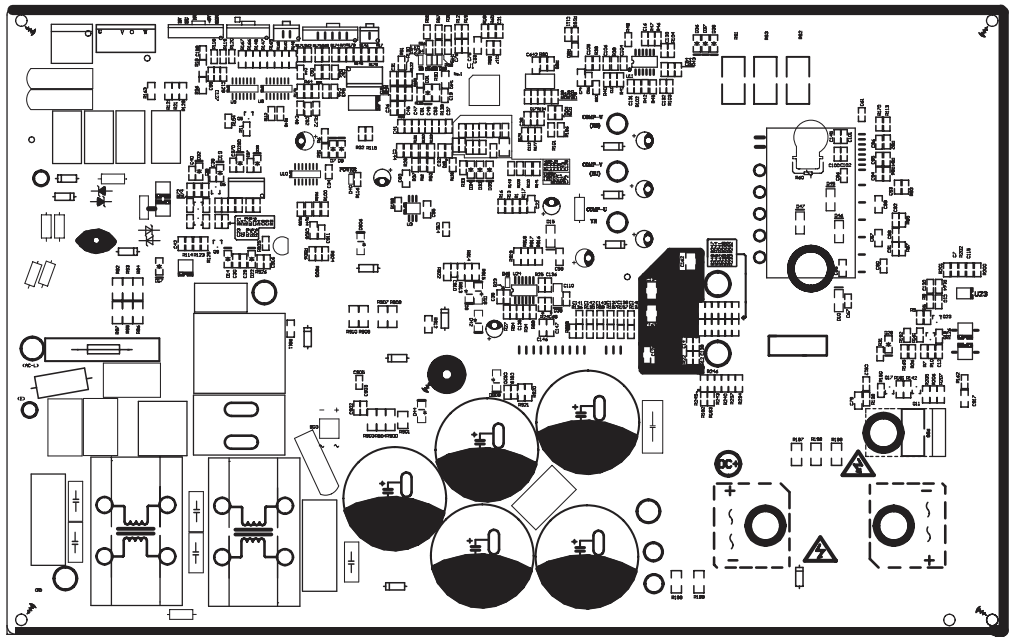
Outdoor Unit

● TOP VIEW



1	Compressor interface	2	Compressor overload protector	3	Temperature sensor	4	Electric expansion valve
5	Fan HALL interface	6	Outdoor fan	7	4-way valve	8	Communication interface with indoor unit
9	Live wire	10	Earthing wire	11	Neutral wire	12	Reactor interface 1
13	PFC capacitor interface 1	14	Reactor interface 2				

● BOTTOM VIEW



6. Function and Control

6.1 Remote Controller Description

Signal transmitter

Remote control

ON/OFF

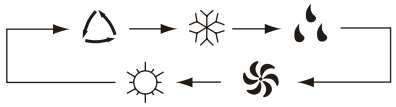
ON/OFF button

- Press this button, the unit will be turned on, press it once more, the unit will be turned off. Sleep function will be canceled, while unit off.

MODE

MODE button

- Press this button, Auto, Cool,Dry, Fan, Heat mode can be selected circularly. Auto mode is default while power on. Under Auto mode,the temperature will not be displayed; Under Heat mode, the initial value is 28℃(82°F);Under other modes, the initial value is 25℃(77°F).

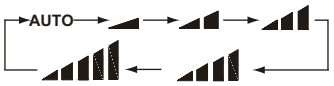


AUTO
COOL
DRY
FAN
HEAT
(only for cooling and heating unit)

FAN

FAN button

- Press this button, Auto, Low , Medium-low , Medium, Medium-high, High speed can be circularly selected. After powered on, Auto fan speed is default. Under DRY mode, Low fan speed only can be set up.



Low fan
Medium-low fan
Medium fan
Medium-high fan
High fan

Note: It's Low fan speed under Dry mode.

TEMP

TEMP button

- Press this button, can set up and select: setting temperature (displaying the room), indoor ambient temperature (displaying indoor temperature), outdoor ambient temperature (displaying outdoor temperature),if there no outdoor ambient temperature displaying be required that will keep original display status. and circulate like this. No signal displayed. Remark: When operating this button,the setting temperature is displayed all the time on the wireless remote control. (There is no this function for this unit. If press this key, the main unit will click, but it also runs under original status.)

Note: Besure that there are no obstructions between receiver and remote controller; Don't drop or throw the remote control; Don't let any liquid get into remote controller and put the remote controller directly under the sunlight or any place where is very hot.

Remote control

CLOCK

CLOCK button

- Press this button, the clock can be set up, signal ◴ blink and display.Within 5 seconds, the value can be adjusted by pressing + or - button, if continuously press this button for 2 seconds above, in every 0.5 seconds, the value on ten place of Minute will be increased 1. During blinking, repress the Clock button or Confirm button, signal ◴ will be constantly displayed and it denotes the setting succeeded. After powered on, 12:00 is defaulted to display and signal ◴ will be displayed. If there is signal ◴ be displayed that denotes the current time value is Clock value, otherwise is Timer value.

LIGHT

LIGHT button

- Press this button at unit on or off status, Light on and light off can be set up. After powered on, Light on is defaulted.

TURBO

TURBO button

- Under Cool or Heat mode,press this button can turn on or turn off the Turbo function.After the Turbo function turned on, the signal of Turbo will display. The signal will be automatically cancelled if changing the mode or fan speed.

X-FAN

X-FAN button

- Pressing X -FAN button in COOL or DRY mode,the icon ✿ is displayed and the indoor fan will continue operation for 10 minutes in order to dry the indoor unit even though you have turned off the unit. After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO,FAN or HEAT mode.

+

+ button

- Presetting temperature can be increased. Press this button,the temperature can be set up, continuously press this button and hold for two seconds, the relative contents can quickly change,until unhold this button and send the order that the ℃ (°F) signal will be displayed all the time. The temperature adjustment is unavilable under the Auto mode, but the order can be sent by if pressing this button. Temperature of Celsius degree setting: 16-30 ; for Fahrenheit degree setting: 61-86.

-

- button

- Presetting temperature can be decreased. Press this button, the temperature can be set up, continuously press this button and hold for two seconds, the relative contents can quickly change,until unhold this button and send the order that the ℃ (°F) signal will be displayed all the time. The temperature adjustment is unavailable under the Auto mode,but the order can be sent by if pressing this button.

QUIET

QUIET button

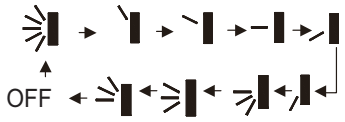
- Press this button,the Quiet status is under the Auto Quiet mode (display " 🎧 " and “Auto”signal) and Quiet mode (display "🎧" singal) and Quiet OFF (there is no signal of " 🎧 " displayed), after powered on,the Quiet OFF is defaulted. Note: the Quiet function cannot be set up in Fan and Dry mode; Under the Quiet mode (Display "🎧 " signal), the fan speed is not available.

This wireless remote control is universal, and it could be used for many units, some buttons of this control which are not available to this unit will not be described below.

Remote control

SWING UP AND DOWN BUTTON

- Press this button to set swing angle, which circularly changes as below:



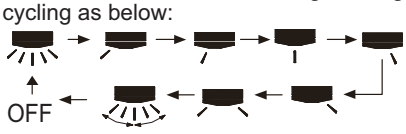
This remote controller is universal. If it receives threes kinds of following status, the swing angle will remain origial.

If guide louver is stopped when it is swinging up and down,it will remain its present position.

indicates guide louver swings back and forth in the five places,as shown in the figure.

SWING LEFT AND RIGHT BUTTON

- Press this button to set left & right swing angle cycling as below:



TIMER OFF

TIMER OFF button

- One press this key to enter into TIMER OFF setup, in which case the TIMER OFF icon will blink. The method of setting is the sameas for TIMER ON.

TIMER ON

TIMER ON BUTTON

- Timer On setting: Signal “ON”will blink and display,signal ◴ will conceal,the numerical section will become the timer on setting status. During 5 seconds blink,by pressing＋ or －button to adjust the time value of numerical section, every press of that button,the value will be increased or decreased 1 minute.Hold pressing ＋or －button,2 seconds later,it quickly change, the way of change is: During the initial 2.5 seconds, ten numbers change in the one place of minute, then the one place is constant,ten numbers change in the ten splace of minute at 2.5 seconds speed and carry. During 5s blink,press the Timer button,the timer setting succeeds.The Timer On has been set up,repress the timer button,theTimer On will be canceled. Before setting theTimer,please adjust the Clock to the current actual time.

I FEEL

I FEEL BUTTON

- Press this button once, to turn on the I FEEL function, then the figure of "I FEEL" will be displayed, after every press of other function button, every 200ms to send I FEEL once, after this function started, the remote control will send temperature to the main unit in every 10 minutes.When repress this button, this function will be turned off.

HEALTHY AND SCAVENGING BUTTON

- Press this button to achieve the on and off of healthy and scavenging functions in operation status.Press this button for the first time to start scavenging function; LCD displays“ ”.Press the button for the second time to start healthy and scavenging functions simultaneously;LCD displays“ ” and “ ” . Press this button for the third time to quit healthy and scavenging functions simultaneously.Press the button for the fourth time to start healthy function; LCD display“ ” .Press this button again to repeat the operation above.

SLEEP

SLEEP BUTTON

- Press this button, can select Sleep 1 (1), Sleep 2 (2), Sleep 3 (3) and cancel the Sleep, circulate between these, after electrified, Sleep Cancel is defaulted.
- Sleep 1 is Sleep mode 1, in Cool, Dehumidify modes: sleep status after run for one hour , the main unit setting temperature will increase 1℃,setting temperature increased 2℃ , the unit will run at this setting temperature; In Heat mode: sleep status after run for one hour , the setting temperature will decrease 1℃, 2 hours , setting temperature will decrease 2℃, then the unit will run at this setting temperature.
- Sleep 2 is sleep mode 2, that is air conditioner will run according to the presetting a group of sleep temperature curve.

  In Cool mode:

  (1) When setting the initial temperature 16-23℃, after turned on Sleep function, the temperature will be increased 1℃ in every hour, after 3℃ the temperature will be maintained, after 7hours, the temperature will be decreased 1℃, after that the unit will keep on running under this temperature;

  (2) When setting the initial temperature 24℃～27℃, after turned on Sleep function, the temperature will be increased 1℃ in every hour , after 2℃ the temperature will be maintained, after 7hours, the temperature will be decreased 1℃, after that the unit will keep on running under this temperature;

  (3) When setting the initial temperature 28℃～29℃, after turned on Sleep function, the temperature will be increased 1℃ in every hour, after 1℃ the temperature will be maintained, after 7hours , the temperature will be decreased 1℃, after that the unit will keep on running under this temperature;

  (4) When setting the initial temperature 30℃, under this temperature setting, after 7hours, the temperature will be decreased 1℃, after that the unit will keep on running under this temperature;

  In Heat mode:

  (1) Under the initial presetting temperature 16℃, it will run under this setting temperature all along.

  (2) Under the initial presetting temperature17℃～20℃, after Sleep function started up, the temperature will decrease 1℃ in every hour, after 1℃ decreased, this temperature will be maintained.

SLEEP

SLEEP BUTTON

(3) Under the initial presetting temperature 21℃～27℃, after Sleep function started up, the temperature will decrease 1℃ in every hour, after 2℃ decreased, this temperature will be maintained.

(4) Under the initial presetting temperature 28℃～30℃, after Sleep function started up, the temperature will decrease 1℃ in every hour, after 3 ℃ decreased, this temperature will be maintained.

- Sleep 3- the sleep curve setting under Sleep mode by DIY:

(1) Under Sleep 3 mode, press "Turbo" button for a long time, remote control enters into user individuation sleep setting status, at this time, the time of remote control will display "1hour ", the setting temperature "88" will display the corresponding temperature of last setting sleep curve and blink (The first entering will display according to the initial curve setting value of original factory);

(2) Adjust " + " and " - " button, could change the corresponding setting temperature, after adjusted, press "Trubo "button for confirmation;

(3) At this time, 1hour will be automatically increased at the timer postion on the remote control, (that are "2hours" or "3hours " or "8hours "), the place of setting temperature "88" will display the corresponding temperature of last setting sleep curve and blink;

(4) Repeat the above step (2)～(3) operation, until 8hours temperature setting finished, sleep curve setting finished, at this time, the remote control will resume the original timer display; temperature display will resume to original setting temperature.

- Sleep3- the sleep curve setting under Sleep mode by DIY could be inquired:

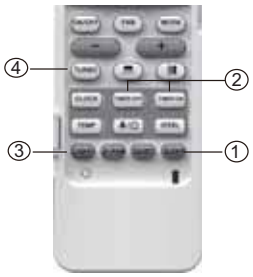
The user could accord to sleep curve setting method to inquire the presetting sleep curve, enter into user individuation sleep setting status, but do not change the temperature, press "Turbo" button directly for confirmation.

Note: In the above presetting or enquiry procedure, if continuously within10s, there is no button pressed, the sleep curve setting status will be automatically quit and resume to display the original displaying. In the presetting or enquiry procedure, press "ON/OFF" button, "Mode" button, "Timer"button or "Sleep" button, the sleep curve setting or enquiry status will quit similarly.

Guide for operation- general operation

1. After powered on, press ON/OFF button, the unit will start to run.
   (Note: When it is powered on, the guide louver of main unit will close automatically.)
2. Press MODE button, select desired running mode.
3. Pressing + or - button, to set the desired temperature (It is unnecessary to set the temp. at AUTO mode.)
4. Pressing FAN button, set fan speed, can select AUTO FAN, LOW, MEDIUM-LOW, MEDIUM, MEDIUM-HIGH and HIGH.
5. Pressing and button, to select the swing.

Guide for operation- Optional operation



1. Press SLEEP button, to set sleep.
2. Press TIMER ON and TIMER OFF button, can set the scheduled timer on or timer off.
3. Press LIGHT button, to control the on and off of the displaying part of the unit (This function may be not available for some units).
4. Press TURBO button, can realize the ON and OFF of TURBO function.

Introduction for special function

★ About X-FAN function

This function indicates that moisture on evaporator of indoor unit will be blowed after the unit is stopped to avoid mould.

1. Having set X-FAN function on: After turning off the unit by pressing ON/OFF button indoor fan will continue running for about 10 min. at low speed. In this period, press X-FAN button to stop indoor fan directly.

2. Having set X-FAN function off: After turning off the unit by pressing ON/OFF button, the complete unit will be off directly.

★ About AUTO RUN

When AUTO RUN mode is selected, the setting temperature will not be displayed on the LCD, the unit will be in accordance with the room temp. automatically to select the suitable running method and to make ambient comfortable.

★ About turbo function

If start this function, the unit will run at super-high fan speed to cool or heat quickly so that the ambient temp. approachs the preset temp. as soon as possible.

★ About lock

Press + and - buttons simultaneously to lock or unlock the keyboard. If the remote controlleris locked, the icon will be displayed on it, in which case, press any button, the mark will flicker for three times. If the keyboard is unlocked, the mark will disappear.

★ About swing up and down

1. Press swing up and down button continuously more than 2s,the main unit will swing back and forth from up to down, and then loosen the button, the unit will stop swinging and present position of guide louver will be kept immediately.

2. Under swing up and down mode, when the status is switched from off to , if press this button again 2s later, status will switch to off status directly; if press this button again within 2s,the change of swing status will also depend on the circulation sequence stated above.

★ About swing left and right

1. Press swing left and right button continuously more than 2s,the main unit will swing back and forth from left to right, and then loosen the button, the unit will stop swinging and present position of guide louver will be kept immediately.

2. Under swing left and right mode, when the status is switched from off to , if press this button again 2s later, status will switch to off status directly; if press this button again within 2s,the change of swing status will also depend on the circulation sequence stated above.

★ About switch between Fahrenheit and Centigrade

Under status of unit off, press MODE and - buttons simultaneously to switch ºC and ºF.

★ Combination of " TEMP" and "CLOCK" buttons : About Energy-saving Function

Press “TEMP” and “CLOCK” simultaneously in COOL mode to start energy-saving function.Nixie tube on the remote controller displays “SE”. Repeat the operation to quit the function.

★ Combination of " TEMP" and "CLOCK" buttons : About 8℃ Heating Function

Press “TEMP” and “CLOCK” simultaneously in HEAT mode to start 8℃ Heating Function.Nixie tube on the remote controller displays “ ” and a selected temperature of “8℃” (46℉ if Fahrenheit is adopted). Repeat the operation to quit the function.

★ About Quiet function

If Auto Quiet mode has been selected, after the room temperature reached the setting temperature or 10mins later, the AC will immediately enter into the Quiet running status, at this time the fan speed is not adjustable.

★ About Sleep function

Under the Fan and Auto mode, the Sleep function cannot be set up, under Dehumidify mode, only Sleep 1 can be selected. Select and enter into any kind of Sleep mode, the Quiet function will be attached and stared, different Quiet status could be optional and turned off.

6.2 Replacement of Batteries

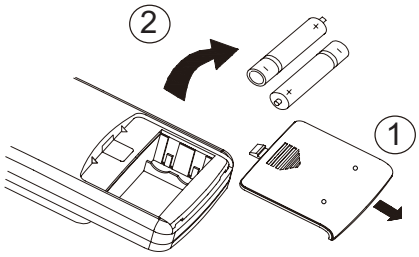
1.Slightly to press the place with ▽, along the arrowhead direction to push the back cover of wireless remote control.(As show in Fig 1.)

2.Take out the old batteries.

3.Insert two new AAA1.5V dry batteries, and pay attention to the polarity. (As show in Fig 2.)

4. Attach the back cover of wireless remote control.

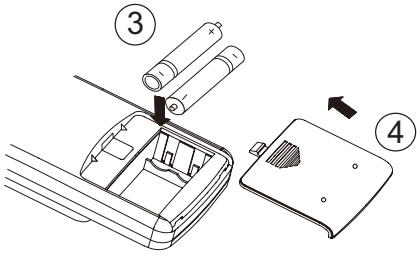
Fig.1



NOTE:

- When changing the batteries, do not use the old or different batteries, otherwise, it can cause the malfunction of the wireless remote control.
- If the wireless remote control will not be used for along time, please take them out, and don't let the leakage liquid damage the wireless remote control.
- The operation should be in its receiving range.
- It should be placed where is 1m away from the TV set or stereo sound sets.
- If the remote control cannot operate normally, please take the batteries out, and then reinsert it 30s later; if it is also abnormal ,please replace the batteries.
- If the main unit needs to be remote controlled, please aim remote controller at the receiver of main unit in order to improve the receiving sensitivity of the main unit.
- When the remote controller sends out signal, a mark will flicker for about 1s. The bell will ring if the main unit receives effective signal.

Fig.2

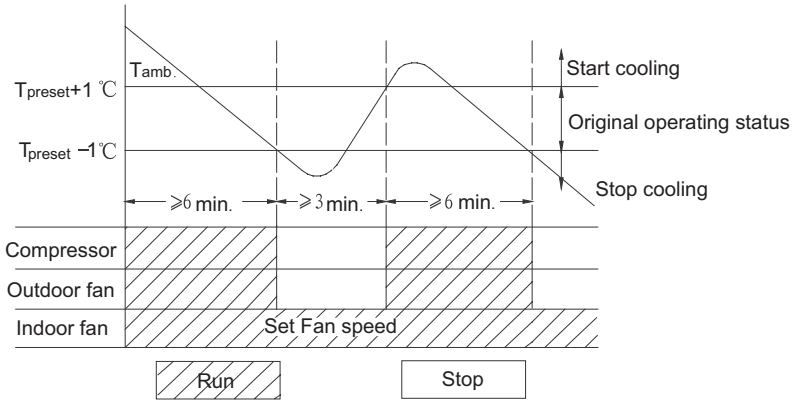


Sketch map for changing batteries

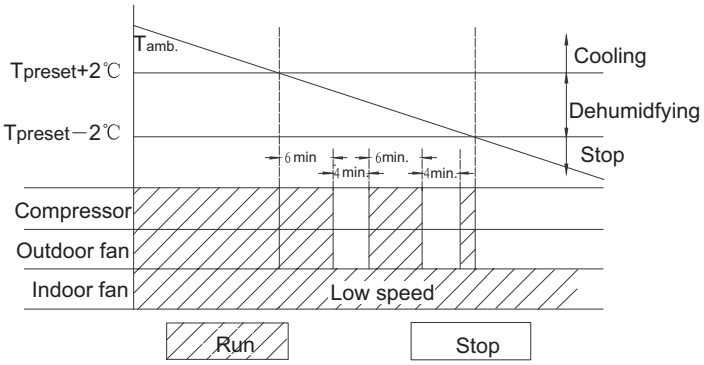
6.3 Description of Each Control Operation

● Indoor Unit

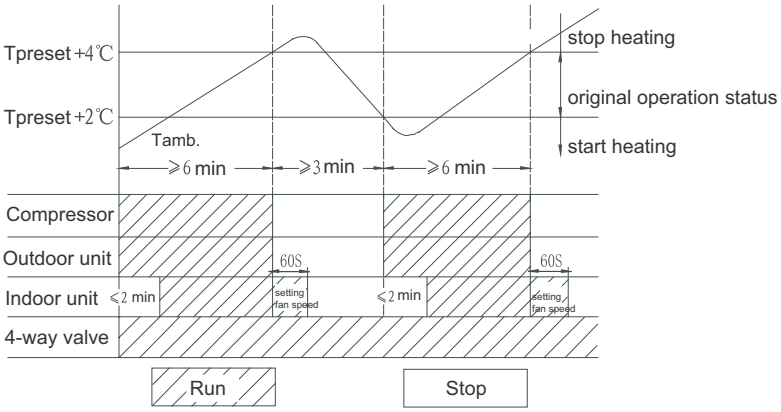
1Temperature Parameters
◆Indoor preset temperature (Tpreset)
◆Indoor ambient temperature (Tamb.)
2 Basic functions (The temperature in this manual is expressed by Centigrade. If Fahrenheit is used, the switchover between them is Tf=TcX1.8+32.)
Once the compressor is energized, there should be a minimum interval of 3 minutes between two start-ups. But if the unit is de-energized and then energized, the compressor can restart within 3 minutes.
2.1 Cooling mode
2.1.1 Cooling conditions and process
When Tamb. ≥Tpreset, the unit starts cooling operation. In this case, the compressor and the outdoor fan operate and the indoor fan operates at set speed.
When Tamb. ≤Tpreset-3℃, the compressor and the outdoor fan stop while the indoor fan runs at set speed.
When Tpreset-3℃＜Tamb. ＜Tpreset, the unit will maintain its previous running status.
In cooling mode, temperature setting range is 16～30℃; the indoor unit displays operation icon, cooling icon and set temperature.



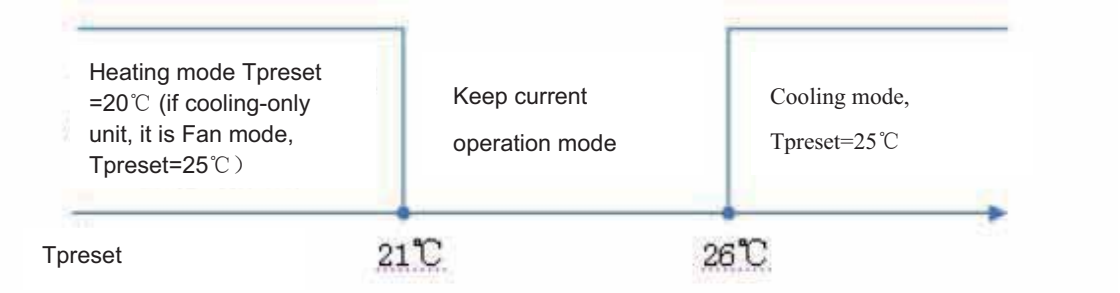
2.1.2 When outdoor unit has malfunction or stops for protection, indoor unit will keep previous operation status and display malfunction code.
2.1.3 The protection status is as the same as the cooling mode.
2.2 Dry Mode
2.2.1 Dry Conditions and Process
When Tamb. ＞Tpreset, the unit starts drying and cooling operation. In this case, the compressor and the outdoor fan operate; the indoor fan operates at low speed.
When Tpreset-3℃≤Tamb. ≤Tpreset, the unit will start drying operation. In this case, the indoor fan operates at low speed; the compressor and the outdoor fan operate for 6 minutes and stop for 4 minutes in cycle.
When Tamb.＜Tpreset-3℃, the compressor and the outdoor fan stop operation; the indoor fan operates at low speed.
In drying mode, the four-way valve is de-energized; temperature setting range is 16～30℃; the indoor unit displays operation icon, drying icon and set temperature.



2.2.2 When outdoor unit has malfunction or stops for protection, indoor unit will keep previous operation status and display malfunction code.
2.2.3 The protection status is as the same as the cooling mode.
2.3 Heating mode (not available for cooling only type)
2.3.1 Heating conditions and process
When Tamb. ≤Tpreset+2℃, the unit starts heating operation. In this case, compressor and outdoor fan operate simultaneously; the indoor fan operates at cold-air prevention mode.
When Tamb≥Tpreset+5℃, the compressor and outdoor fan stop operation; the indoor fan blows residual heat.
When T_{preset} +2℃＜$T_{amb.}$ ＜ T_{preset} +5℃, the unit will maintain its previous running status.
Under this mode, temperature setting range is 16～30℃; the indoor unit displays operation icon, heating icon and set temperature.

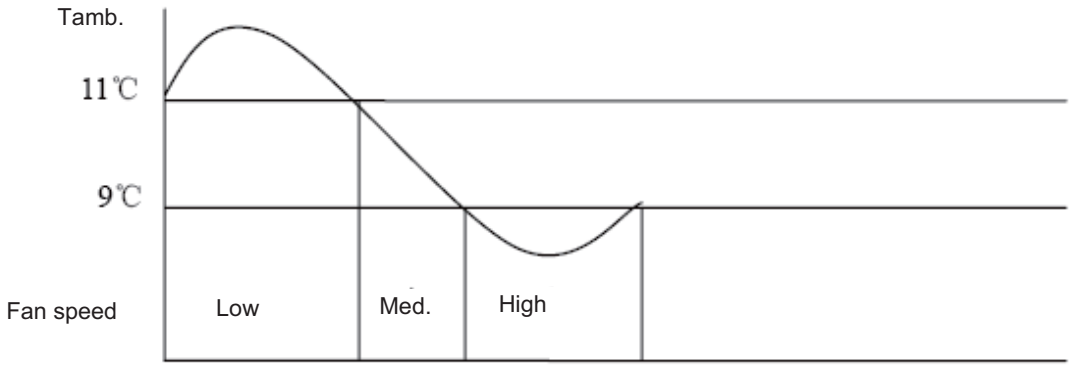


2.3.2 Defrosting and Oil Return
When receiving the signal of defrosting and oil return, the horizontal louver(big one) will rotate to the position where the angle is minimum and the other horizontal louver(small one) will close. In 10 seconds later, indoor fan will stop operation. During defrosting, oil return and 5 minutes after quit, all indoor pipe temperature sensors will not be detected. When receiving oil return signal or defrosting signal sent by outdoor unit, “dual 8” nixie tube will display “H1”. (H1 is not malfunction code.)
2.3.3 Blow residual heat
In heating mode, when temperature reaches the set temperature, the compressor and outdoor fan will stop.
The horizontal louver (big one) will rotate to the default position for cooling and the other one (small one) will close. Indoor unit will operate at set speed for 60s and then stop operation.
When the unit is in heating mode or auto heating mode, and also the compressor and indoor fan are operating, if turning off the unit, compressor and outdoor fan will stop. Horizontal louver (big one) will rotate to the position where gentle wind is blown out (default position for cooling) and the other horizontal louver (small one) will close. Indoor unit will operate at low speed for 10 seconds and then the unit will be turned off.
2.4 Fan Mode
In this mode, indoor fan operates at set speed while compressor and outdoor fan stop operation. The set temperature range is 16~30℃. Operation icon and set temperature are displayed.
2.5 Auto Mode
In this mode, operation mode (Cool, Heat, Fan) will be automatically selected according to change of ambient temperature. Operation icon, actual operation icon and set temperature will be displayed. There is 30s delay for protection when changing mode. The protection function is as the same as that under each mode.
2.5.1 When Tamb.≥26℃，the unit will operate at cooling mode, the default set temperature is 25℃.
2.5.2 When Tamb. ≤21℃，the unit will operate at heating mode, the default set temperature is 20℃（if the cooling only unit operates at fan mode, the default set temperature is 25℃.）;
2.5.3 When 22 ℃ ≤Tamb. ≤25℃， and the unit is turned on for the first time, if it changes to auto mode from other mode, the previous operation mode will be maintained; If it changes to auto mode from dry mode, the unit will operate at fan mode.
2.5.4 When the unit operates at auto mode, the frequency of compressor is as the same as that under cooling mode, while it is as the same as that under heating mode.
Protection function
A. Under cooling mode, the protection function is as the same as that under cooling mode.
B. Under heating mode, the protection function is as the same as that under heating mode.

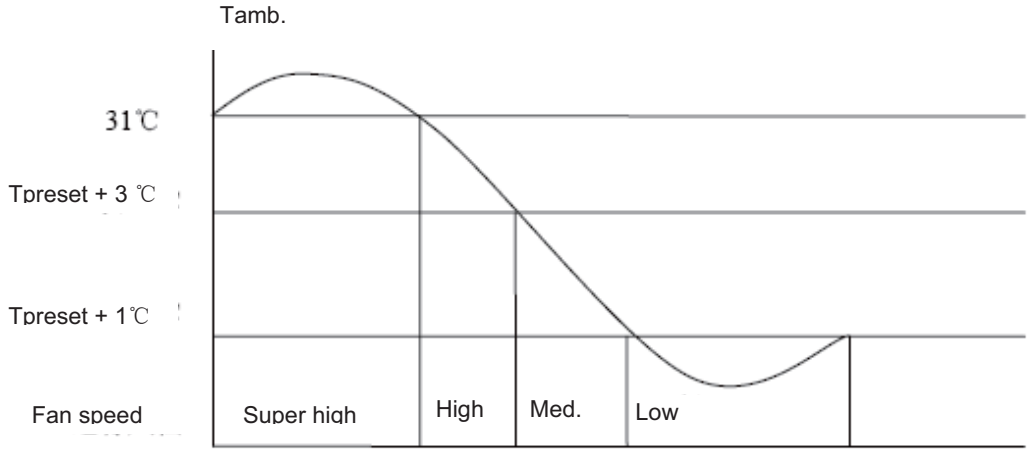


2.6. “8℃” Heating
Under heating mode, press buttons “Temp” and “Clock” simultaneously, the 8℃ heating function will be activated and “cold air prevention” will be shielded.
2.6.1 8 ℃ heating can’t co-exist with sleep function. If 8℃heating function is set, it can be cancelled by pressing sleep button, In that case, the set temperature will be that before entering 8 ℃ heating; If sleep function is set, press buttons “Temp” and “Clock” simultaneously to activate 8℃ function and cancel sleep function at the same time.
2.6.2 Set temperature is 8 ℃， and it is displayed on the indoor display panel.
2.6.3 In this mode, TURBO can’t be set and fan speed can’t be adjusted.
2.6.4 In this mode, when compressor operates, fan speed will be adjusted as follows; when compressor stops operation, indoor unit will operate at blowing residual heat.
When Tindoor amb. ≤9℃, indoor unit will operate at high speed;

When 9℃ ＜Tindoor amb.＜11℃, indoor unit will operate at medium speed;
When Tindoor amb.≥11℃， indoor fan will operate at low speed;
When changing among low high, medium, and low speeds, the minimum operation time is 210 seconds.
2.6.5 If the unit has memory function, 8℃heating function will be memorized.

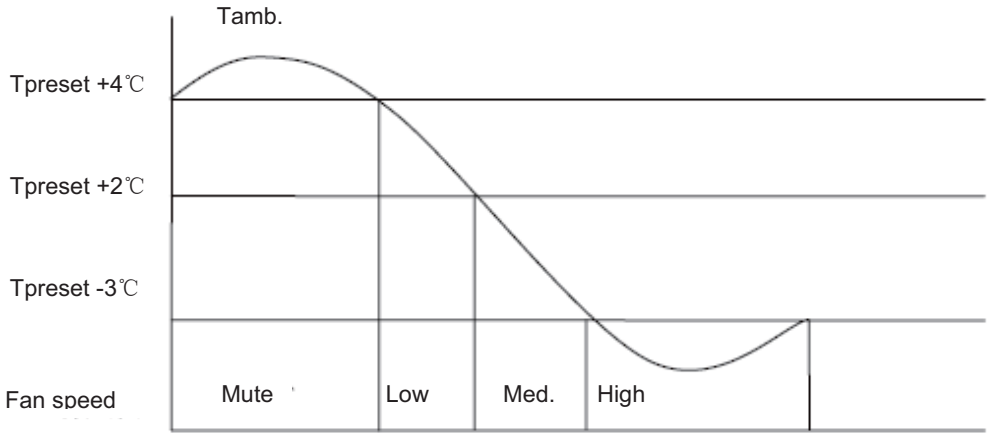


2.7 Energy-saving Function
2.7.1 In cooling mode, when receiving command of energy-saving sent by remote control, the controller enters energy-saving mode; If the unit is under energy-saving mode already, such command will not be executed.
2.7.2 When remote control is set to display set temperature, “dual 8”nixie tube displays “SE”.
2.7.3 In this mode, when compressor operates, fan speed will be adjusted according to auto fan mode under energy-saving operation; when compressor stops operation, indoor fan will operate at low speed.
a. When Tamb.≥31℃, indoor fan will operate at super high speed;
b. When 31℃＞Tamb.≥Tpreset + 3℃, indoor fan will operate at high speed;
c. When Tpreset+1℃＜Tamb.＜Tpreset + 3℃， indoor fan will operate at medium speed;
d. When Tamb.≤Tpreset + 1℃， indoor fan will operate at low speed;
Note: The switchover among superhigh speed, high speed, medium speed and low speed requires minimum 210seconds of operation.

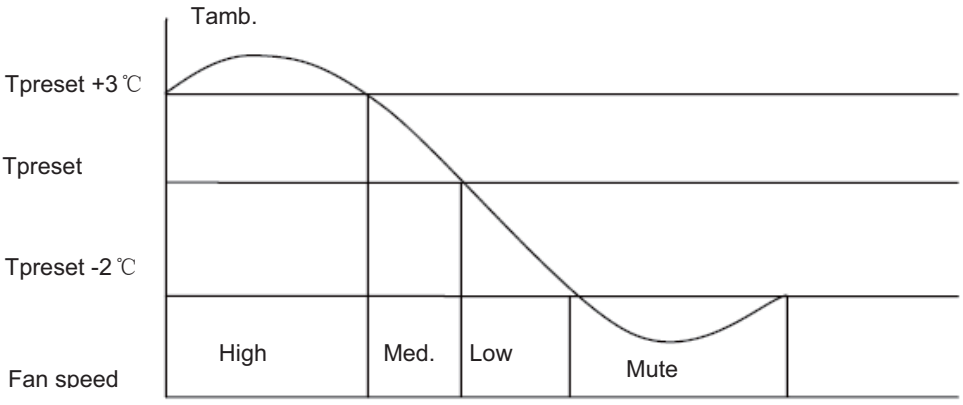


2.7.4 In this mode, set temperature will be automatically adjusted according to actual operation conditions.
3 Other Control
3.1 Timer function
General timer and clock timer functions are compatible by equipping remote controller with different functions.
3.1.1 General Timer
Timer ON can be set at unit OFF. If selected ON time is reached, the unit will start to operate according to previous setting status. Time setting range is 0.5-24hr in 30-minute increments.
Timer OFF can be set at unit ON. If selected OFF time is reached, the unit will stop operation. Time setting range is 0.5-24hr in 30-minute increments.
3.1.2 Clock Timer
Timer ON
If timer ON is set during operation of the unit, the unit will continue to operate. If timer ON is set at unit OFF, upon ON time reaches the unit will start to operate according to previous setting status.
Timer OFF
If timer OFF is set at unit OFF, the system will keep standby status. If timer OFF is set at unit ON, upon OFF time reaches the unit will stop operation.

Timer Change
Although timer has been set, the unit still can be turned on/off by pressing ON/OFF button of the remote controller. You can also set the timer once again, and then the unit will operate according to the last setting.
If timer ON and timer OFF are set at the same time during operation of the unit, the unit will keep operating at current status till OFF time reaches.
If timer ON and timer OFF are set at the same time at unit OFF, the unit will keep off status till ON time reaches.
Each day in future, the system will operate according to preset mode till OFF time reaches and stop operation till ON time reaches. If ON time and OFF time are the same, OFF command will prevail.
3.2 Auto Button
If this button is pressed, the unit will operate in AUTO mode and indoor fan will operate at auto speed; meanwhile, the swing motor operates. Press this button again to turn off the unit.
3.3 Buzzer
Upon energization or availably operating the unit or remote controller, the buzzer will give out a beep.
3.4 Sleep Function
In SLEEP mode, the unit will automatically select appropriate sleep curve to operate according to different temperature setting.
3.5 Turbo Function
This function can be set in cooling or heating mode to quickly cool or heat the room.
3.6 X-FAN Function
3.6.1 When the unit is operating at COOL or DRY mode(it is not available under AUTO, HEAT, FAN modes), the X-FAN function can be turned on/off. When it is turned on,once pressing ON/OFF button to turn off the unit, indoor fan will continue operation at low speed for 10 minutes. Within the 10 minutes, horizontal louver will keep its previous status while cold plasma and static dedusting will be forced to be turned on and other loads will be turned off. Then the complete unit will be turned off; When X-FAN function is set to be off, once pressing ON./OFF button, the complete unit will be turned on immediately.
3.6.2 During X-FAN operation, press X-FAN button, the indoor fan, horizontal louver, cold plasma and static-dedusting will be turned off immediately.
3.7 Control of Indoor Fan
Indoor fan can be set by remote control within the range of Mute, Fan speed 1, Fan speed 2, Fan speed 3, Fan speed 4, Fan speed 5 and Turbo and Fan will operate at low, med. high or super high speed accordingly. And also, auto fan speed can be set. Under auto fan speed mode, indoor fan will automatically select high, med., low or mute speed according to change of ambient temperature.
3.7.1 Under Auto Heat mode or regular Heat mode, auto fan speed will be as follows:
When Tamb.＜Tpreset-3℃, indoor fan will operate at high speed;
When Tpreset-3℃≤Tamb.＜Tpreset + 2℃， indoor fan will operate at med. speed;
When Tpreset + 2℃≤Tamb.＜Tpreset + 4℃, indoor fan will operate at low fan speed;
When Tamb≥Tpreset + 4℃， indoor fan will operate at mute.
Control Diagram of Auto Fan Speed under HEAT Mode



3.7.2 Under FAN or COOL mode: if it is auto cooling mode or regular cooling mode, auto fan speed will be as follows:
When Tamb. ≥ Tpreset + 3 ℃, indoor fan will operate at high speed;
When Tpreset ＜Tamb.＜Tpreset + 3℃， indoor fan will operate at med. speed;
When Tpreset-2℃＜Tamb.≤Tpreset, indoor fan will operate at low speed;
When Tamb.≤Tpreset-2 ℃， indoor fan will operate at mute;
3.7.3 There is no auto fan speed under DRY mode
Note: Fan speed “High”, “Med.” and “Low” are respectively corresponding to “Fan speed 5”, “Fan speed 3” and “Fan speed 1”. There is 210 seconds delay for fan speed switchover of auto fan.



3.8 Vertical Swing

3.8.1 Small Horizontal Louver

After energization, vertical swing motor will firstly have the horizontal louver rotate anticlockwise to position O to close air outlet. If swing function has not been set after startup of the unit, horizontal louver will turn clockwise to position D1 in HEAT mode. If swing function is set when starting up the unit, the horizontal louver will swing between O and D1.There are 7 swing status of horizontal louver: Positions O, A1, B1, C1 and D1, swing between O and D1 and stop at any position between L and D (angles between O and D1 are equiangular). Upon turning off the unit, the horizontal louver will close at position O. Swing function is available only when swing function is set and indoor fan is operating.

Note:

a. If the position is set between O and D1, A 1and C1 or B1 and D1 by remote controller, the horizontal louver will swing between O and D1.

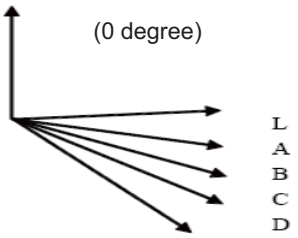
b. For model 9K/12K, only when big horizontal louver rotates to the second position for heating(62°of corresponding angle), this louver will be activated; For 18K model, only when big horizontal louver rotates to the first position for heating(64°of corresponding angle), this louver will be activated; For 24K mode, only when big horizontal louver rotates to the first position for heating(40°of corresponding angle), this louver will be activated.

c. Under cooling mode, this horizontal louver will be always in the position O.

3.8.2 Big Horizontal Louver

After energization, up & down swing motor will firstly have the horizontal louver rotate anticlockwise to position O to close air outlet. If swing function has not been set after startup of the unit, horizontal louver will turn clockwise to position D in HEAT mode, or turn clockwise to level position L in other modes. If swing function is set when starting up the unit, the horizontal louver will swing between L and D.There are 7 swing status of horizontal louver: Positions L, A, B, C and D, swing between L and D and stop at any position between L and D (angles between L and D are equiangular). Upon turning off the unit, the horizontal louver will close at position O.

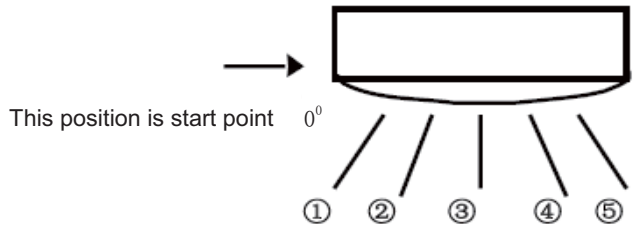
Note: If the position is set between L and B, A and C or B and D by remote controller, the horizontal louver will swing between L and D.



3.9 Horizontal Swing

Upon energization, the vertical louver will be reset to the start position firstly and then stop in the middle position. When setting

horizontal swing, there are 7 status: Position ①, Position ②, Position ③, Positon ④, Position ⑤, swing between ① and ⑤ and stop at any position between ①and ⑤. If setting horizontal swing during operation of the unit, the horizontal swing motor will drive the louver to swing horizontally. When cancelling horizontal swing or it is not set when turning on the unit, the louver will stop in the current position and it will not move when turning off the unit. Only when swing is set and indoor fan is operating, the vertical louver can horizontally swing.



3.10 Display
3.10.1 Operation and Mode Icons
Upon energization, the unit will display all icons within 3 seconds. Under standby state, LED lamp of standby is on. If the unit is turned on by remote controller, LED lamp of operation is on; meanwhile, the mark of current running mode will be displayed. If the light button is turned off, no mark will be displayed.

3.10.2 Display of Nixie Tube on Indoor Unit
When energized & started for the first time, the indoor unit defaults to displaying current set temperature (16～30℃). When set temperature display is set by remote controller, it will display set temperature; when room temperature display is set, it will display room or outdoor temperature. After that, when operating the remote controller for other settings, the temperature display method will keep original.
When operating the remote controller during room temperature display, the set temperature will be displayed for 5 seconds firstly and then room temperature display returns. If there is malfunction, corresponding malfunction code will be displayed. For example, if ambient temperature sensor has malfunction, “F1” will be displayed; if indoor pipe temperature has malfunction, “F2” will be displayed; if jumper cap has malfunction, “C5” will be displayed.
3.11 Memory Function
Memorized items: mode, up & down swing, light, set temperature and set fan speed.
When power is recovered after power failure, the unit will automatically start operation according to memorized status. After power recovery, the unit without timer setting before power failure will operate according to the last setting; the unit with general timer setting which has not been fulfilled before power failure will memorize the timer setting and re-calculate the time after.
3.12 I FEEL function
When I FEEL command is received by controller, and also the ambient temperature is received from remote control, the controller will operate according to the ambient temperature sent by the remote controller (For cold blow prevention, the unit operates according to the ambient temperature sensed by the air conditioner). The remote controller will send ambient temperature data to the controller for every 10 minutes. When the data has not been received for 11 minutes, the unit will operate according to the temperature sensed by the air conditioner. If I FEEL function is not selected, the ambient temperature will be that sensed by the air conditioner. Ambient temperature of I FEEL displayed by controller is 1℃~59℃.
3.13 Health and Cold Plasma Function
When the unit is operating, turn health or cold plasma to be ON/OFF by health button in remote control (if there is no such button in remote control, the health is on as default). Only when health or cold plasma is turned on and indoor fan is operation, such function can be activated.
3.14 Static Dedusting Function
When the unit is operating, turn static dedusting ON/OFF by health button in remote control (if there is no such button in remote control, the health is on as default). Only when static dedusting is turned on and indoor fan is operation, such function can be activated.
3.15 Independent Air Exchange Function
3.15.1 Press air button to keep air exchanger operating.
3.15.2 Press air button again to de-energize the air exchanger and the air exchange function is turned off;
3.15.3 When the unit is turned off by Timer and pressing ON/OFF button, air exchange will be turned off as well.
3.15.4 When the unit is off, the air exchange function can also be set by remote control.
3.16. Fahrenheit Display
Nixie tube displays current set temperature. If remote signal is Fahrenheit, the temperature will be displayed in Fahrenheit. The set temperature range is 16~30℃（61~86℉）. Under Auto mode, in COOL operation and FAN operation, 25℃(77℉) will be displayed, while in HEAT operation and FAN operation, 20℃(68℉) will be displayed. For cooling-only controller, only 25℃(77℉) will be displayed.
3.17 Locked protection to Indoor Fan Motor
If the indoor fan motor keeps low rotation speed for a continuous period of time after startup, the unit will stop operation and display “H6”.
3.18 Mute Mode
3.18.1 Auto Mute: When selecting fan speed of auto mute, the fan speed will be adjusted according to change of ambient temperature; when temperature meets the requirement of the setting, the unit will operate at lowest speed.
3.18.2 Mute mode: When selecting fan speed of mute, the unit will directly operate at lowest fan speed.

● Outdoor Unit

1. Compensation function of input parameters
According to the structure of wall-mounting unit, considering the comfortability for operation, indoor ambient temperature when the compressor is at OFF status is higher than set temperature under heating mode.
2. Control of detecting the availability of parameters
For ensuring the safety and reliability of operation, please insert the outdoor discharge temperature sensor into the corresponding temperature sensor bushing to make sure that the control system can detect system discharge temperature accurately. Otherwise, the unit will stop operation and it displays malfunction of discharge temperature sensor (discharge temperature sensor hasn't been inserted well), which can only be resumed by pressing ON/OFF button on remote controller. Basic functions:
3. Cooling mode
3.1 Working condition and process for cooling
3.1.1 If compressor is at OFF status, and $(T_{preset}-(T_{indoor\ amb.}-\Delta T_{indoor\ amb.\ compensation\ of\ cooling}))\leq 0℃$, the unit operates in cooling mode;
3.1.2 During cooling operation, if $0℃\leq(T_{preset}-(T_{indoor\ amb.}-\Delta T_{indoor\ amb.\ compensation\ of\ cooling}))<3℃$, the unit still operates in cooling mode;
3.1.3 During cooling operation, if $3℃\leq(T_{preset}-(T_{indoor\ amb.}-\Delta T_{indoor\ amb.\ compensation\ of\ cooling}))$, the unit stops operation when reaching the temperature point in cooling.
3.2 Temperature setting range:
3.2.1 If $T_{outdoor\ amb.}\geq T_{cooling\ temperature(low\ temperature)}$, the temperature setting range is 16-30℃ (cooling in room temperature);
3.2.2 If $T_{outdoor\ amb.}<T_{cooling\ temperature(low\ temperature)}$, the temperature setting range is 25-30℃. That is: the lower limit of set temperature for outdoor unit is 25℃.
4. Dry mode
4.1 Working conditioner and process for drying is same as that for cooling mode;
4.2 Temperature setting range is 16-30℃;
5. Fan mode
5.1 Compressor, outdoor fan and 4-way valve are all turned off;
5.2 Temperature setting range is 16-30℃.
6. Heating ode
6.1 Working conditioner and process of heating: ($T_{indoor\ amb.}$ is the actual temperature detected by indoor ambient temperature sensor; $\Delta T_{indoor\ amb.\ compensation\ of\ heating}$ is indoor ambient temperature compensation during heating operation).
6.1.1 If compressor is at OFF status, and $(T_{indoor\ amb.}-\Delta T_{indoor\ amb.\ compensation\ of\ heating})-T_{preset})\leq -1℃$, the unit operates in heating mode.
6.1.2 During heating operation, if $0℃\leq((T_{indoor\ amb.}-\Delta T_{indoor\ amb.\ compensation\ of\ heating})-T_{preset})<2℃$, the unit still operates in heating mode.
6.1.3 During heating mode, if $2℃\leq((T_{indoor\ amb.}-\Delta T_{indoor\ amb.\ compensation\ of\ heating})-T_{preset})$, the unit stops operation when reaching the temperature point in heating.
6.2 Under this mode, the temperature setting range is 16-30℃.
7. Defrosting control （heating mode）
7.1 If it turns to defrosting time and it detected that the defrosting temperature is satisfied for 3mins successively, the unit turns into defrosting process.
7.2 Defrosting-starting: compressor stops operation and restart it up after 55s delayed,
7.3 Defrosting-ending: Compressor stops operation and it starts up after 55s delayed.
7.4 When any one of below defrosting-ending conditions is satisfied, the unit will quit from defrosting operation:
7.4.1 $T_{outdoor\ tube}\geq T_{quit\ temperature\ 1}$ for defrosting;
7.4.2 Defrosting operation time is reached $T_{max.defrosting\ time.}$
8. Control of compressor
8.1Frequecny of compressor intangibly controls the frequency according to the relation between ambient temperature and set temperature, and the change speed of ambient temperature;
8.2 Under cooling, heating or drying mode, compressor will be started up after outdoor fan is started for 5s.
8.3 At the OFF status, stop operation because of protection and switchover to fan mode, the compressor stops operation immediately.
8.4 Under each mode: Once the compressor is started up, it can be stopped only after operation.
8.5 Under each mode, one the compressor is stopped, it can be restarted up only after 3min delayed
9. Control of outdoor fan
9.1 When turn off the unit by remote controller, stop operation because of protection or stop operation after reaching the temperature point, outdoor can stop operation only after the compressor is stopped for 1min;
9.2 Under fan mode: outdoor fan stops operation.
9.3 defrosting-starting: enter into defrosting. Outdoor fan stops operation after compressor stops for 50s.
9.4 Defrosting-ending: quit defrosting. When the compressor stops operation, the outdoor fan operates.
10. Control of 4-way valve
10.1 4-way valve status under cooling, drying and fan modes: OFF;
10.2 When the unit turned on and operated in heating mode, the 4-way valve is energized immediately.
10.3 If turn off unit or switch to other mode in heating mode, the 4-way valve is de-energized after the compressor stops for 2min;
10.4 When the unit is turned off because of each protection, the 4-way valve is de-energized after 4 mins delayed.
10.5 Defrosting-starting: enter into defrosting. After the compressor stops for 50s, the 4-way valve will be de-energized.
10.6 Defrosting-ending: quit defrosting. After the compressor stops for 50s, the 4-way valve is energized.
11. Freeze protection
11.1 Under cooling or drying mode, if it's detected that $T_{inner\ tube}<0$ for 3min successively, the unit will stop operation due to freeze protection. If $T_{limit\ temperature\ of\ freeze\ protection}<T_{inner\ tube}$, and compressor stops for 3min, the complete can resume operation;

11.2 Under cooling or drying mode, if $T_{inner\ tube}$ <6, the operation frequency of compressor may increase or decrease;
11.2.1 If the unit is stopped because of freeze protection for 6 times successively, it can't resume operation automatically and the malfunction will be displayed continuously, which can only be resumed by pressing ON/OFF button. During operation, if operation time of compressor is over, the times of stop operation because of freeze protection will be cleared. If turn off the unit or switch to fan/heating mode, malfunction and times of malfunction is eliminated immediately.
12. Overload protection
12.1 Overload protection under cooling or drying mode: If $T_{overload\ stop\ operation\ temp.\ in\ cooling} \leq T_{outdoor\ tube}$, the unit stops operation because of overload in cooling; if $T_{outdoor\ tube} < T_{overload\ limit\text{-}frequecny\ temp\ in\ cooling}$ and the compressor has stopped for 3min, the complete unit can resume operation.
12.2 Under cooling or drying mode, if $T_{overload\ limit\text{-}frequecny\ temp.\ in\ cooling} \leq T_{outdoor\ tube}$, the frequency of compressor may increase or decrease;
12.3 Overload protection under heating mode: If $T_{overload\ stop\ operation\ temp.\ in\ heating} \leq T_{indoor\ tube}$, the unit stops operation because of overload in heating; if $T_{indoor\ tube} < T_{overload\ limit\text{-}frequecny\ temp.\ in\ heating}$ and the compressor has stopped for 3min, the complete unit can resume operation.
12.4 Under heating mode. If $T_{overload\ limit\text{-}frequecny\ temp.\ in\ heating} \leq T_{indoor\ tube}$, operation frequency of compressor may increase or decrease;
12.5 If the unit is stopped because of overload protection for 6 times successively, it can't resume operation automatically and the malfunction will be displayed continuously, which can only be resumed by pressing ON/OFF button. During operation, if operation time of compressor is over, the times of stop operation because of overload protection will be cleared. If turn off the unit, fan or switch to fan/heating mode, malfunction and times of malfunction is eliminated immediately.
13. Discharge temperature protection of compressor
13.1 If $T_{stop\ operation\ temperature\ for\ discharge} \leq T_{discharge}$, the unit stops operation because of discharge protection; If $T_{discharge} < T_{limit\text{-}frequecny\ temperature\ for\ discharge}$ and compressor has stopped for 3min, the complete unit can resume operation;
13.2 If $T_{normal\ speed\ decrease\text{-}frequency\ for\ discharge} \leq T_{discharge}$, operation frequency of compressor may decrease or increase;
13.3 If the unit is stopped because of discharge protection of compressor for 6 times successively, it can't resume operation automatically, which can only be resumed by pressing ON/OFF button. During operation, if operation time of compressor is over, the times of stop operation because of discharge protection will be cleared. If turn off the unit, or switch to fan/heating mode, malfunction and times of malfunction is eliminated immediately.
14. Current protection function
14.1 If $13A \leq I_{AC\ current,}$ operation frequency of compressor may decrease or increase;
14.2 If $17A \leq I_{AC\ current,}$ the system will stop operation because of overcurrent; the complete unit can resume operation only after the compressor stops for 3min;
14.3 If the unit is stopped because of overcurrent for 6 times successively, it can't resume operation automatically, which can only be resumed by pressing ON/OFF button. During operation, if operation time of compressor is over, the times of stop operation because of overcurrent protection will be cleared.
15. Voltage drop protection
During operation of compressor, if the voltage is decreasing quickly, the system may stop operation and voltage drop malfunction is caused. 3min later, the system will be restarted up automatically.
16. Communication malfunction
When it hasn't received the correct signal from indoor unit for 3min, the unit will stop operation because if communication malfunction; If communication malfunction is eliminated and compressor has stopped for 3in, the complete unit can resume operation.
17. OPM module protection
After compressor is turned on, if the overcurrent happens for IPM module, or control voltage is too low because of abnormal causes, IPM will detect module protection signal immediately. Once it detected the module protection signal, the unit will stop operation because of module protection. If module protection is resumed and compressor has stopped for 3min, the complete unit will resume operation.
If the unit is stopped because of module protection for 3 times successively, the unit can resume operation automatically unless press ON/OFF button. If the operation time for compressor is over, the times of stop operation because of module protection will be cleared.
18. Overheat protection of module
18.1 If $T_{normal\ speed\ frequency\text{-}decreasing\ temp.\ of\ module} \leq T_{module}$, the operation frequency of compressor may decrease or increase;
18.2 If $T_{stop\ operation\ temperature\ of\ module} \leq T_{module}$, the syste will stop operation for protection. If $T_{module} < T_{frequency\text{-}limiting\ temperature\ of\ module}$ and compressor has stopped for 3min, the complete unit will resume operation;
18.3 If the unit is stopped because of overheating of compressor module for 6 times successively, it can't resume operation automatically, which can only be resumed by pressing ON/OFF button. During operation, if operation time of compressor is over, the times of stop operation because of compressor overheating protection will be cleared. If turn off the unit, or switch to fan mode, times of malfunction is eliminated immediately.
19. Overload protection of compressor
19.1 If it detected that the overload switch for compressor is open for 3min successively, the complete unit will stop operation for protection;
19.2 If overload protection is resumed and compressor has stopped for 3min, the complete unit can resume operation;
19.3 If the unit stops operation because of overload protection for compressor for 3times successively, it can't resume operation automatically, which can only be resumed by pressing ON/OFF button. After compressor has operated for 30min, overload protection times for compressor will be eliminated.

7. Installation Manual

7.1 Notices for Installation

Caution

1.The unit should be installed only by authorized service center according to local or government regulations and in compliance with this manual.
2.Before installing, please contact with local authorized maintenance center. If the unit isnot installed by the authorized service center, the malfunction may not be solved due to incovenient contact between the user and the service personnel.
3.When removing the unit to the other place, please firstly contact with the local authorized service center.
4.Warning: Before obtaining access to terminals, all supply circuits must be disconnected.
5.For appliances with type Y attachment, the instructions shall contain the substance of the following. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
6.The appliance must be positioned so that the plug is accessible.
7.The temperature of refrigerant line will be high; please keep the interconnection cable away from the copper tube.
8.The instructions shall state the substance of the following:
This appliance is not intended for use by persons(including children)with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
Children should be supervised to ensure that they do not play with the appliance.

7.1.1 Installation Site Instructions

Proper installation site is vital for correct and efficient operation of the unit. Avoid the following sites where:
●strong heat sources, vapours, flammable gas or volatile liquids are emitted.
●high-frequency electro-magnetic waves are generated by radio equipment,welders and medical equipment.
●salt-laden air prevails (such as close to coastal areas).
●the air is contaminated with industrial vapours and oils.
●the air contains sulphures gas such as in hot spring zones.
●corrosion or poor air quality exists.

7.1.2 Installation Site of Indoor Unit

1.The air inlet and outlet should be away from the obstructions. Ensure the air can be blown through the whole room.
2.Select a site where the condensate can be easily drained out, and where it is easily connected to outdoor unit.
3.Select a place where it is out of reach of children.
4.Select a place where the wall is strong enough to withstand the full weight and vibration of the unit.
5.Be sure to leave enough space to allow access for routine maintenance. The installation site should be 250cm or more above the floor.
6.Select a place about 1m or more away from TV set or any other electric appliance.
7.Select a place where the filter can be easily taken out.
8.Make sure that the indoor unit is installed in accordance with installation dimension instructions.
9.Do not use the unit in the laundry or by swimming pool etc.

7.1.3 Installation Site of Outdoor Unit

1.Select a site where noise and outflow air emitted by the unit will not annoy neighbors.
2.Select a site where there is sufficient ventilation.
3.Select a site where there is no obstruction blocking the inlet and outlet.
4.The site should be able to withstand the full weight and vibration.
5.Select a dry place, but do not expose the unit to direct sunlight or strong wind.
6.Make sure that the outdoor unit is installed in accordance with the installation instructions, and is convenient for maintenance and repair.
7.The height difference between indoor and outdoor units is within 10m, and the length of the connecting tubing does not exceed 25m.
8.Select a place where it is out of reach of children.
9.Select a place where the unit does not have negative impact on pedestrians or on the city.

7.1.4 Safety Precautions for Electric Appliances

1.A dedicated power supply circuit should be used in accordance with local electrical safety regulations.
2.Dont drag the power cord with excessive force.
3.The unit should be reliably earthed and connected to an exclusive earth device by the professionals.
4.The air switch must have the functions of magnetic tripping and heat tripping to prevent short circuit and overload.
5.The minimum distance between the unit and combustive surface is 1.5m.
6.The appliance shall be installed in accordance with national wiring regulations.
7.An all-pole disconnection switch with a contact separation of at least 3mm in all poles should be connected in fixed wiring.

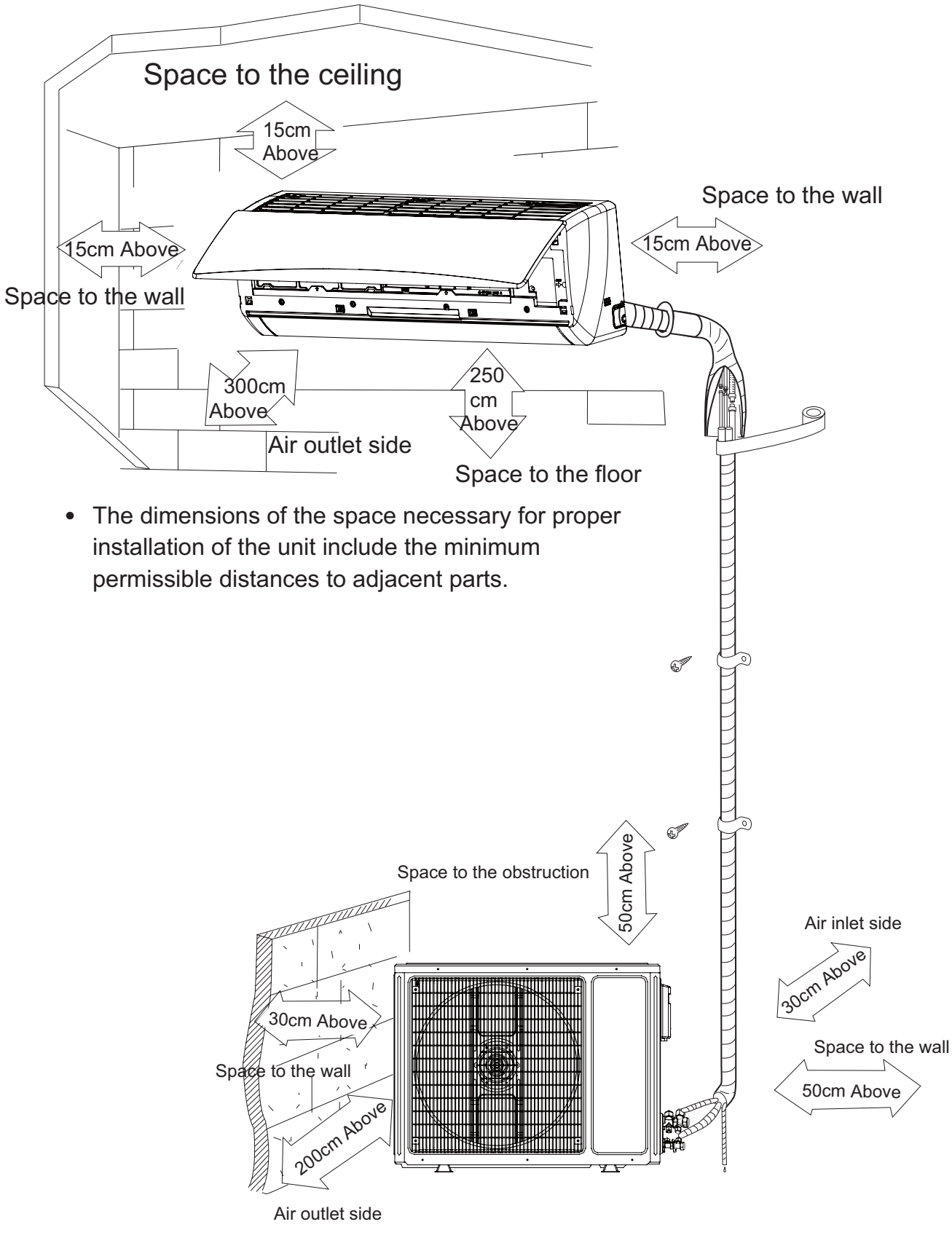
Note:

- Make sure the live wire, neutral wire and earth wire in the family power socket are properly connected.
- There should be reliable circuit in the diagram.Inadequate or incorrect electrical connections may cause electric shock or fire.

7.1.5 Earthing Requirements

1.Air conditioner is type I electric appliance. Please ensure that the unit is reliably earthed.
2.The yellow-green wire in air conditioner is the earthing wire which can not be used for other purposes. Improper earthing may cause electric shock.
3.The earth resistance should accord to the national criterion.
4.The power must have reliable earthing terminal. Please do not connect the earthing wire with the following:
① Water pipe ② Gas pipe ③ Contamination pipe ④ Other place that professional personnel consider is unreliable
5. The model and rated values of fuses should accord with the silk print on fuse cover or related PCB.

7.2 Installation Drawing



- The dimensions of the space necessary for proper installation of the unit include the minimum permissible distances to adjacent parts.

7.3 Install Indoor Unit

7.3.1 Installation of Mounting Plate

1.Mounting plate should be installed horizontally. As the water trays outlet for the indoor unit is two-way type, during installation, the indoor unit should slightly slant to water trays outlet for smooth drainage of condensate.
2.Fix the mounting plate on the wall with screws.
3.Be sure that the mounting plate has been fixed firmly enough to withstand about 60 kg. Meanwhile, the weight should be evenly shared by each screw.

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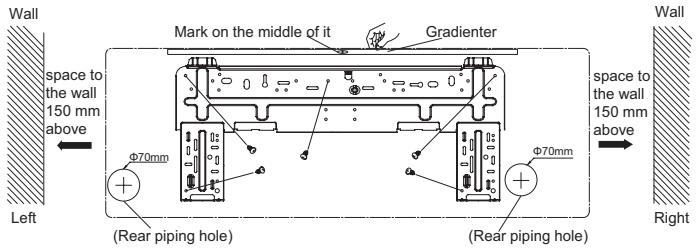
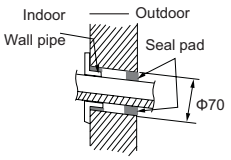


7.3.2 Drill Piping Hole

1.Slant the piping hole (Φ70) on the wall slightly downward to the outdoor side.
2.Insert the piping-hole sleeve into the hole to prevent the connection piping and wiring from being damaged when passing through the hole.



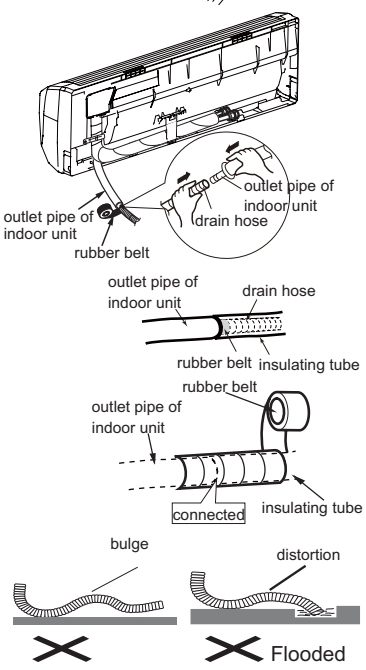
7.3.3 Installation of Drain Hose

1.Connect the drain hose to the outlet pipe of the indoor unit.Bind the joint with rubber belt.

2.Put the drain hose into insulating tube.

3.Wrap the insulating tube with wide rubber belt from the joint of outlet pipe and insulating pipe so as to prevent shift of insulating tube. The drain hose should be placed at a downward slant for easy discharge of condensate.

Note: the insulating tube should be connected reliably with the sleve outside the outlet pipe. The drain hose should be downward slant, without distortion, bulge or fluctuation. Do not put the water outlet in the water.



7.3.4 Connecting Indoor and Outdoor Electric Wires

1.Open the front panel.
2.Remove the wiring cover.Connect and fix power connection cord to the terminal board as shown in Fig 2.
3.Make the power connection cord through the hole in the back of indoor unit.
4.Reinstall the cord anchorage and wiring cover.
5.Reinstall the front panel.

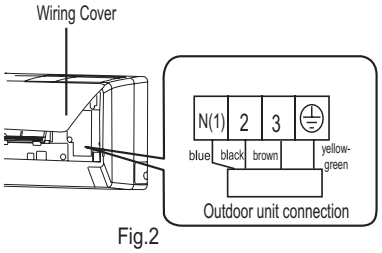


Fig.2

NOTE:
All wires between indoor and outdoor units must be connected by the qualified electric contractor.
● Electric wires must be connected correctly. Improper connection may cause malfunction.
● Tighten the terminal screws securely.
● After tightening the screws, pull the wire slightly to confirm whether its firm or not.
● Make sure that the electric connections are earthed properly to prevent electric shock.
● Make sure that all wiring connections are secure and the cover plates are reinstalled properly. Poor installation may cause fire or electric shock.

7.3.5 Installation of Indoor Unit

●The piping can be output from right, right rear, left or left rear.
1.When routing the piping and wiring from the left or right side of indoor unit, cut off the tailings from the chassis when necessary(As shown in Fig.3)
(1)Cut off the tailing 1 when routing the wiring only;
(2)Cut off the tailing 1 and tailing 2 when routing both the wiring and piping.
2.Take out the piping from body case, wrap the piping, power cords, drain hose with the tape and make them through the piping hole. (As shown in Fig.4)
3.Hang the mounting slots of the indoor unit on the upper hooks of the mounting plate and check if it is firm enough.(As shown in Fig.5)
4.The installation site should be 250cm or more above the floor.

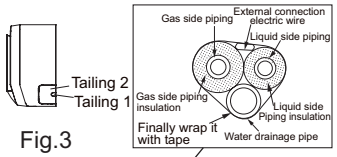


Fig.3

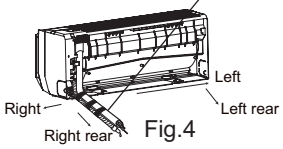


Fig.4

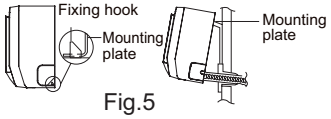
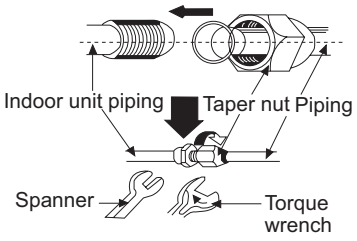


Fig.5

7.3.6 Installation of Connection Pipe

1.Align the center of the pipe flare with the relevant valve.
2.Screw in the flare nut by hand and then tighten the nut with spanner and torque wrench referring to the following:

Hex nut diameter	Tightening torque (N·m)
Φ6	15～20
Φ 9.52	31～35
Φ 12	50～55
Φ 16	60～65
Φ 19	70～75

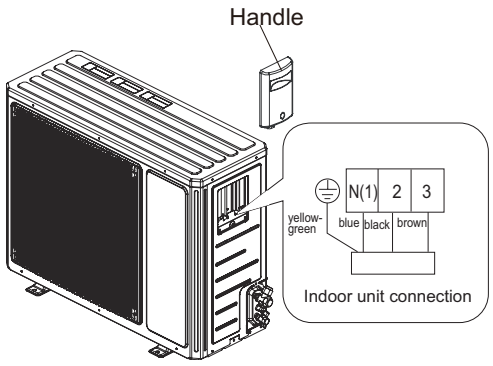


NOTE:
Connect the connection pipe to indoor unit at first and then to outdoor unit. Handle piping bending with care. Do not damage the connection pipe. Ensure that the joint nut is tightened firmly, otherwise, it may cause leakage.

7.4 Installation of Outdoor Unit

7.4.1 Electric Wiring

1.Remove the handle on the right side plate of outdoor unit.
2.Take off wire cord anchorage. Connect and fix power connection cord to the terminal board.Wiring should fit that of indoor unit.
3.Fix the power connection cord with wire clamps and then connect the corresponding connector.
4.Confirm if the wire has been fixed properly.
5.Reinstall the handle.



NOTE:
● Incorrect wiring may cause malfunction of spare part.
● After the wire has been fixed, ensure there is frees pace between the connection and fixing places on the lead wire.

7.4.2 Air Purging and Leakage Test

1. Connect charging hose of manifold valve to charge end of low pressure valve (both high/low pressure valves must be tightly shut).
2. Connect joint of charging hose to vacuum pump.
3. Fully open the handle of Lo manifold valve.
4. Open the vacuum pump for vacuumization. At the beginning, slightly loosen joint nut of low pressure valve to check if there is air coming inside. (If noise of vacuum pump has been changed, the reading of multimeter is 0) Then tighten the nut.
5. Keep evacuating for more than 15mins and make sure the reading of multi-meter is $-1.0X10^5$ pa(-76cmHg).
6. Fully open high/low pressure valves.
7. Remove charging hose from charging end of low pressure valve.
8. Tighten bonnet of low pressure valve. (As shown in Fig.6)

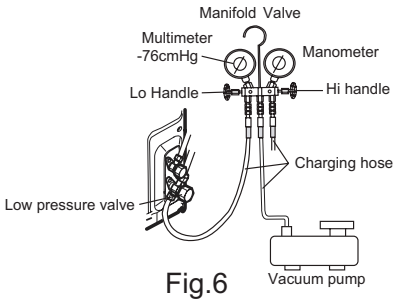
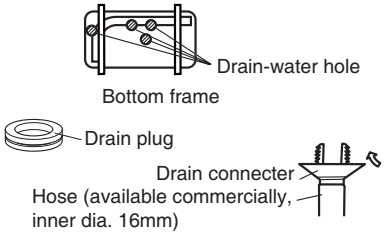


Fig.6

7.4.3 Outdoor condensate Drainage (only for heat pump type)

During heating operation, the condensate and defrosting water should be drained out reliably through the drain hose.Install the outdoor drain connector in a Φ25 hole on the base plate and attach the drain hose to the connector so that the waste water formed in the outdoor unit can be drained out.The hole diameter 25 must be plugged.
Whether to plug other holes will be determined by the dealers according to actual conditions.



7.5 Check after Installation and Test Operation

7.5.1 Check after Installation

Items to be checked	Possible malfunction
Has the unit been fixed firmly?	The unit may drop, shake or emit noise.
Have you done the refrigerant leakage test?	It may cause insufficient cooling(heating)
Is thermal insulation sufficient?	It may cause condensation.
Is water drainage satisfactory?	It may cause water leakage.
Is the voltage in accordance with the rated voltage marked on the nameplate?	It may cause electric malfunction or damage the unit.
Is the electric wiring or piping connection installed correctly and securely?	It may cause electric malfunction or damage the parts.
Has the unit been securely earthed?	It may cause electrical leakage.
Is the power cord specified?	It may cause electric malfunction or damage the parts.
Is the inlet or outlet blocked?	It may cause insufficient cooling(heating)
Is the length of connection pipes and refrigerant capacity recorded?	The refrigerant capacity is not accurate.

7.5.2 Operation Test

1.Before Operation Test
(1)Do not switch on power before installation is finished completely.
(2)Electric wiring must be connected correctly and securely.
(3)Cut-off valves of the connection pipes should be opened.
(4)All the impurities such as scraps and thrums must be cleared from the unit.
2.Operation Test Method
(1)Switch on power and press "ON/OFF" button on the wireless remote controller to start the operation.
(2)Press MODE button to select the COOL, HEAT (Not available for cooling only unit), FAN to check whether the operation is normal or not.

7.6 Installation and Maintenance of Healthy Filter

7.6.1 Installation of Healthy Filter

1.Lift up the front panel from its two ends, as shown by the arrow direction, and then remove the air filter.(as shown Fig.a)

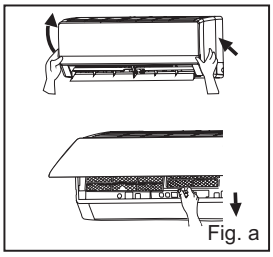


Fig. a

2.Attach the healthy filter onto the air filter, (as shown Fig.b).

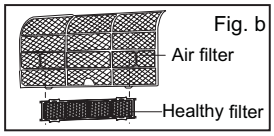


Fig. b

3. Install the air filter properly along the arrow direction in Fig.c, and then close the panel .

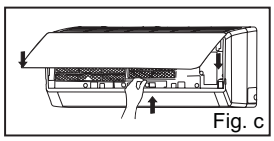


Fig. c

7.6.2 Cleaning and Maintenance

Remove the healthy filter and reinstall it after cleaning according to the installation instruction. Do not use brush or hard objects to clean the filter. After cleaning, be sure to dry it in the shade.

7.6.3 Service Life

The general service life for the healthy filter is about one year under normal condition. As for silver ion filter, it is ineffective when its surface becomes black (green).
●This supplementary instruction is provided for reference to the unit with healthy filter. If the graphics provided herein are different from the actual product, please refer to the actual product. The quantity of healthy filters is based on the actual delivery.

9. Troubleshooting

9.1 Precautions before Performing Inspection or Repair

Be cautious during installation and maintenance. Do operation following the regulations to avoid electric shock and casualty or even death due to drop from high attitude.

* Static maintenance is the maintenance during de-energization of the air conditioner.

For static maintenance, make sure that the unit is de-energized and the plug is disconnected.

*dynamic maintenance is the maintenance during energization of the unit.

Before dynamic maintenance, check the electricity and ensure that there is ground wire on the site. Check if there is electricity on the housing and connection copper pipe of the air conditioner with voltage tester. After ensure insulation place and the safety, the maintenance can be performed.

Take sufficient care to avoid directly touching any of the circuit parts without first turning off the power.

At times such as when the circuit board is to be replaced, place the circuit board assembly in a vertical position.

Normally,diagnose troubles according to the trouble diagnosis procedure as described below.(Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.)

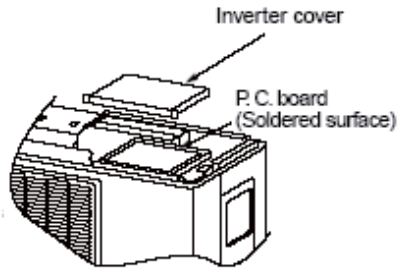
No.	Troubleshooting procedure
1	Confirmation
2	Judgement by Flashing LED of Indoor/Outdoor Unit
3	How to Check Simply the Main Part

NOTE:

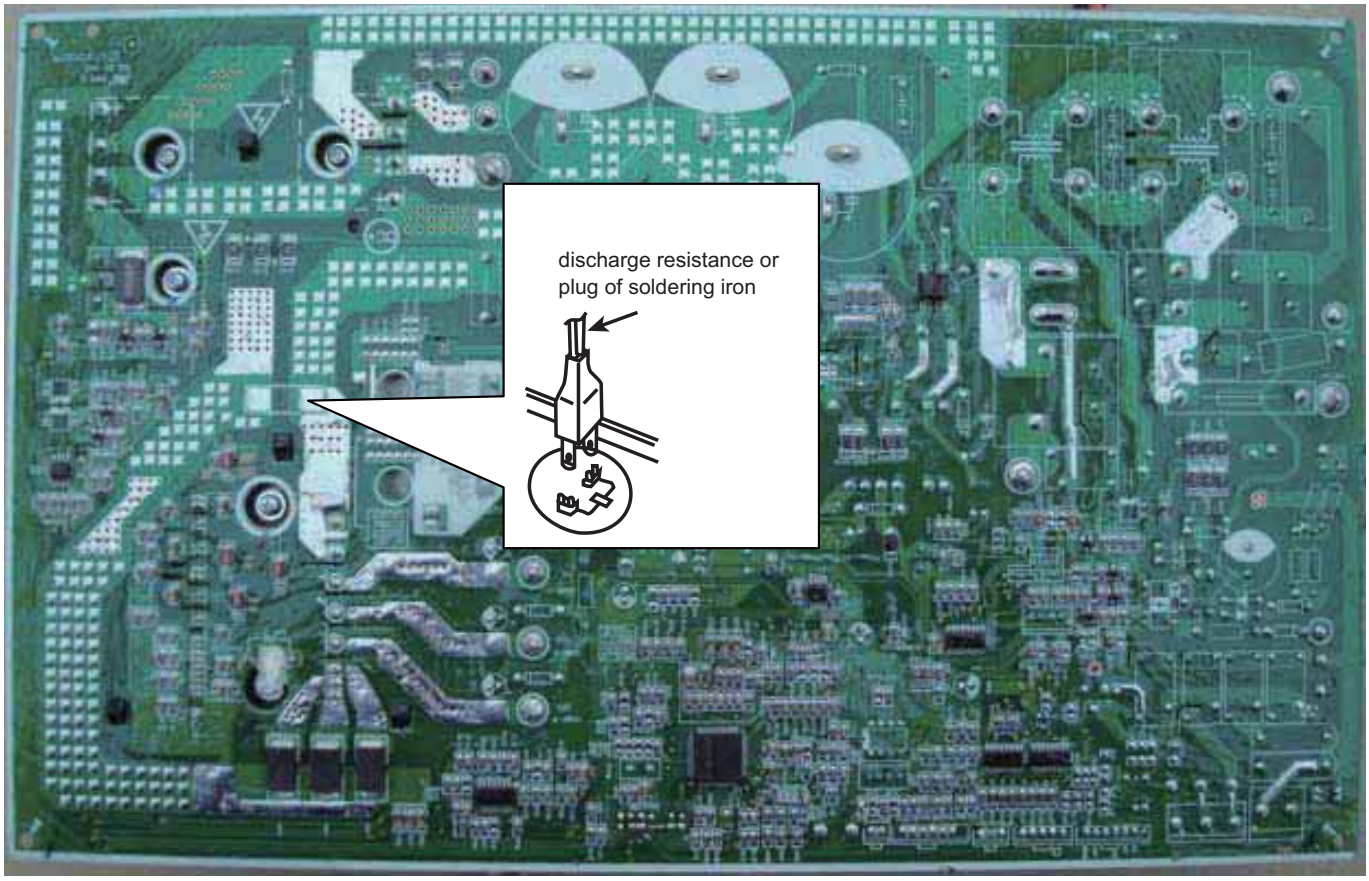
A large-capacity electrolytic capacitor is used in the outdoor unit controller(inverter).Therefore,if the power supply is turned off,charge(charging voltage DC280V to 380V)remains and discharging takes a lot of time. After turning off the power source,if touching the charging section before discharging, an electrical shock may be caused. Discharge the electrolytic capacitor completely by using soldering iron,etc.

<Discharging method>

(1)remove the inverter cover(Outdoor Unit)



(2)As shown below,connect the discharge resistance (approx.100Ω, 20W)or plug of the soldering iron to voltage between + - terminals of the electrolytic capacitor (test 3 “D” and “E” point) on PC Board for 30s, and then perform discharging



9.2 Confirmation

(1)Confirmation of Power Supply
Confirm that the power breaker operates(ON) normally;
(2)Confirmation of Power Voltage
Confirm that power voltage is AC 220-230-240±10%.
If power voltage is not in this range, the unit may not operate normally.

9.3 Judgement by Flashing LED of Indoor/Outdoor Unit

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit (Indicator has 3 kinds of display status and they will be displayed circularly every 5s.)				A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			□OFF ■Illuminated ☆ Blink					
			Operation Indicator	Cool Indicator	Heating Indicator	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
1	High pressure protection of system	E1	OFF 3s and blink once			□	☆	☆	☆	During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment); Ambient temperature is too high.
2	Antifreezing protection	E2	OFF 3S and blink twice			■	□	■	□	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	1. Poor air-return in indoor unit; 2. Fan speed is abnormal; 3. Evaporator is dirty.
3	High discharge temperature protection of compressor	E4	OFF 3S and blink 4 times			■	□	■	☆	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
4	Overcurrent protection	E5	OFF 3S and blink 5 times			□	■	☆	□	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Supply voltage is unstable; 2. Supply voltage is too low and load is too high; 3. Evaporator is dirty.
5	Communi-cation Malfunction	E6	OFF 3S and blink 6 times			□	□	□	☆	During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
6	High temperature resistant protection	E8	OFF 3S and blink 8 times			■	□	■	■	During cooling operation: compressor will stop while indoor fan will operate. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
7	PG motor (indoor fan motor) does not operate	H6	OFF 3S and blink 11 times							Indoor fan, outdoor fan, compressor and electric heat tube stop operation. Horizontal louver stops at the current position.	1. The feedback terminal of PG motor is not connected tightly. 2. The control terminal of PG motor isnot connected tightly.3. Fan blade rotates unsmoothly. 4. Malfunctionof moto.r 5. Controller is damaged.
8	Malfunction protection of jumper cap	C5	OFF 3S and blink 15 times							Operation of remote controller or control panel is available, but the unit won't act.	1. There's not jumper cap on the controller. 2. Jumper cap is not inserted properly and tightly 3. Jumper cap is damaged. 4. Controller is damaged.
9	Indoor ambient temperature sensor is open/short circuited	F1		OFF 3S and blink once						During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	1. The wiring terminal between indoor ambient temperature sensor and controller is loosened or poorly contacted; 2. There's short circuit due to trip-over of the parts on controller;3. Indoor ambient temperature sensor is damaged(Please check it by referring to the resistance table for temperature sensor) 4. Main board is broken.

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit (Indicator has 3 kinds of display status and they will be displayed circularly every 5s.)				A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			□OFF ■Illuminated ☆ Blink					
			Operation Indicator	Cool Indicator	Heating Indicator	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
10	Indoor evaporator temperature sensor is open/short circuited	F2		OFF 3S and blink twice						The unit will stop operation as it reaches the temperature point. During cooling and drying operation, except indoor fan operates, other loads stop operation; During heating operation, the complete unit stops operation.	1. The wiring terminal between indoor evaporator temperature sensor and controller is loosened or poorly contacted; 2. There's short circuit due to the trip-over of the parts on controller; 3.Indoor evaporator temperature sensor is damaged (Please check it by referring to the resistance table for temperature sensor) 4. Main board is broken.
11	Outdoor ambient temperature sensor is open/short circuited	F3		OFF 3S and blink 3 times		□	□	☆	■	During cooling and drying operating, compressor stops while indoor fan operates; During heating operation, the complete unit will stop operation	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
12	Outdoor condenser temperature sensor is open/short circuited	F4		OFF 3S and blink 4 times		□	□	☆	□	During cooling and drying operation, compressor stops while indoor fan will operate; During heating operation, the complete unit will stop operation.	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
13	Outdoor discharge temperature sensor is open/short circuited	F5		OFF 3S and blink 5 times		□	□	☆	☆	During cooling and drying operation, compressor will sop after operating for about 3 mins, while indoor fan will operate; During heating operation, the complete unit will stop after operating for about 3 mins.	1.Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor) 2.The head of temperature sensor hasnt been inserted into the copper tube
14	Limit/ decrease frequency due to overload	F6		OFF 3S and blink for 6 times		■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
15	Decrease frequency due to overcurrent	F8		OFF 3S and blink 8 times		■	■	□	■	All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload
16	Decrease frequency due to high air discharge	F9		OFF 3S and blink 9 times		■	■	□	□	All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV)
17	Voltage for DC bus-bar is too high	PH		OFF 3S and blink 11 times		□	■	□	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
18	Malfunction of complete units current detection	U5		OFF 3S and blink 13 times		□	■	☆	■	During cooling and drying operation, the compressor will stop while indoor fan will operate; During heating operating, the complete unit will stop operation.	Theres circuit malfunction on outdoor units control panel AP1, please replace the outdoor units control panel AP1.
19	Overcurrent protection of phase current for compressor	P5		OFF 3S and blink 15 times		□	☆	□	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.

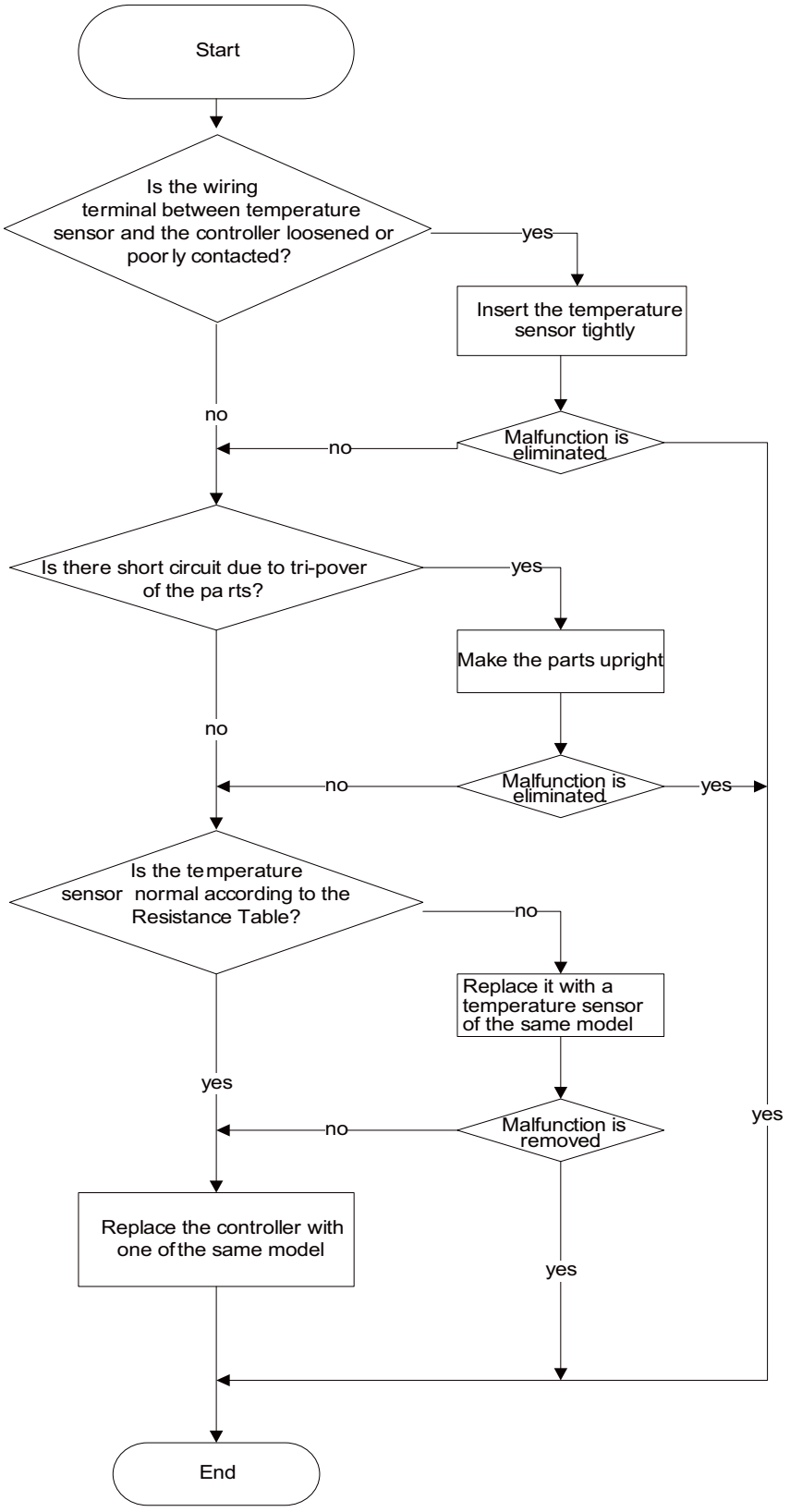
NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit (Indicator has 3 kinds of display status and they will be displayed circularly every 5s.)				A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			□OFF ■Illuminated ☆ Blink					
			Operation Indicator	Cool Indicator	Heating Indicator	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
20	Defrosting	H1			OFF 3S and blink once					Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	Its the normal state
21	Static dedusting protection	H2			OFF 3S and blink twice						/
22	Overload protection for compressor	H3			OFF 3S and blink 3 times	□	☆	☆	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1ohm. 2.Refer to the malfunction analysis (discharge protection, overload)
23	System is abnormal	H4			OFF 3S and blink 4 times	■	□	■	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (overload, high temperature resistant)
24	IPM protection	H5			OFF 3S and blink 5 times	□	☆	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
25	PFC protection	HC			OFF 3S and blink 6 times	□	■	☆	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
26	Desynchron-izing of compressor	H7			OFF 3S and blink 7 times	□	☆	■	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
27	Decrease frequency due to high temperature resistant during heating operation	H0			OFF 3S and blink 10 times	■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
28	Failure start-up	LC			OFF 3S and blink 11 times	□	☆	□	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
29	Malfunction of phase current detection circuit for compressor	U1			OFF 3S and blink 13 times	□	☆	■	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit (Indicator has 3 kinds of display status and they will be displayed circularly every 5s.)				A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			□OFF ■Illuminated ☆ Blink					
			Operation Indicator	Cool Indicator	Heating Indicator	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
30	EEPROM malfunction	EE			OFF 3S and blink 15 times	□	□	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
31	Charging malfunction of capacitor	PU			OFF 3S and blink 17 times	□	■	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Refer to the part three—charging malfunction analysis of capacitor
32	Malfunction of module temperature sensor circuit	P7			OFF 3S and blink 18 times	□	□	■	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
33	Module high temperature protection	P8			OFF 3S and blink 19 times	■	□	☆	■	During cooling operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	After the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
34	Malfunction of voltage dropping for DC bus-bar	U3			OFF 3S and blink 20 times	□	■	■	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Supply voltage is unstable
35	Voltage of DC bus-bar is too low	PL			OFF 3S and blink 21 times	□	■	■	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
36	Limit/ decrease frequency due to high temperature of module	EU				■	■	■	☆	All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
37	The four-way valve is abnormal	U7				■	□	☆	□	If this malfunction occurs during heating operation, the complete unit will stop operation.	1.Supply voltage is lower than AC175V; 2.Wiring terminal 4V is loosened or broken; 3.4V is damaged, please replace 4V.
38	Zero-crossing malfunction of outdoor unit	U9				■	■	☆	□	During cooling operation, compressor will stop while indoor fan will operate; during heating,the complete unit will stop operation.	Replace outdoor control panel AP1
39	Limit/ decrease frequency due to antifreezing	FH				■	■	■	□	All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low

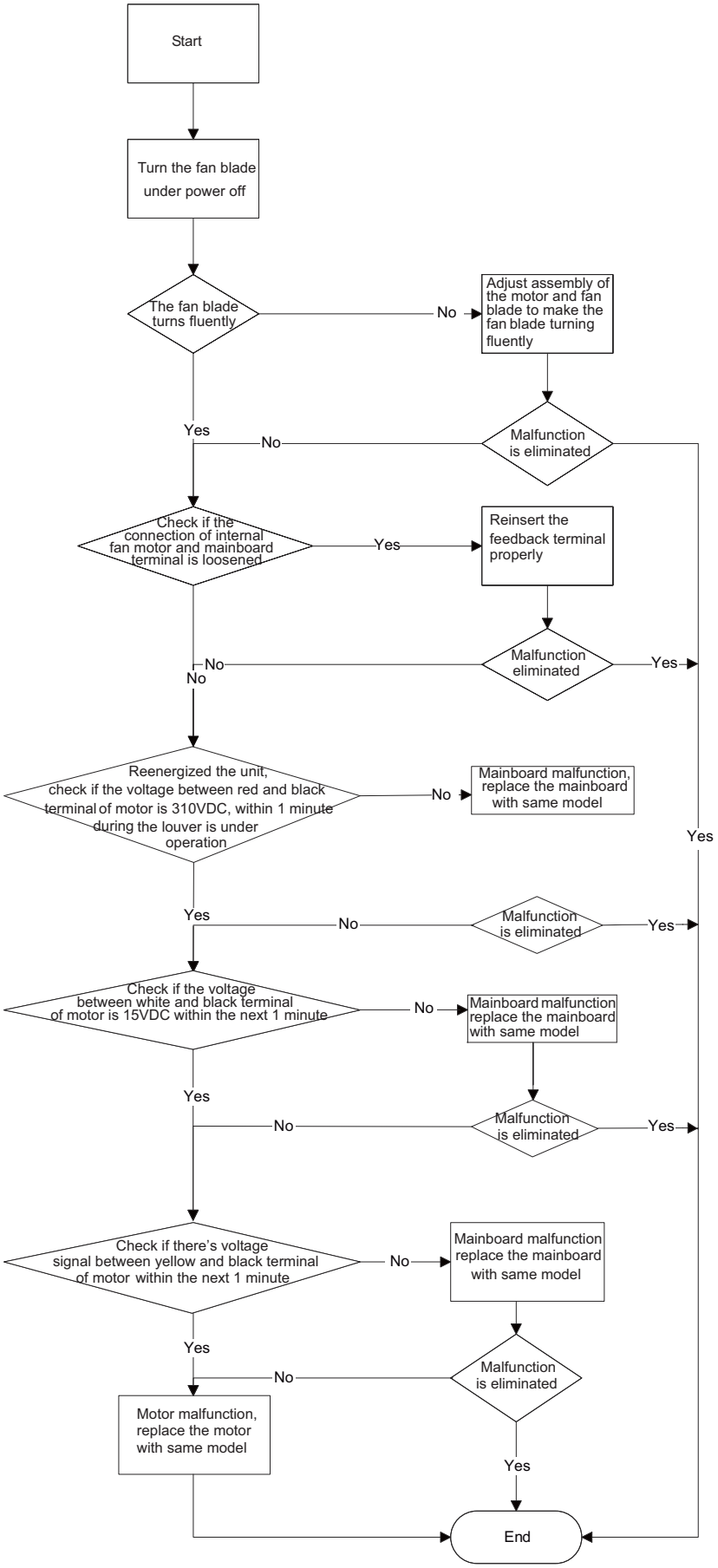
9.4 How to Check Simply the Main Part

4.1 Indoor unit:

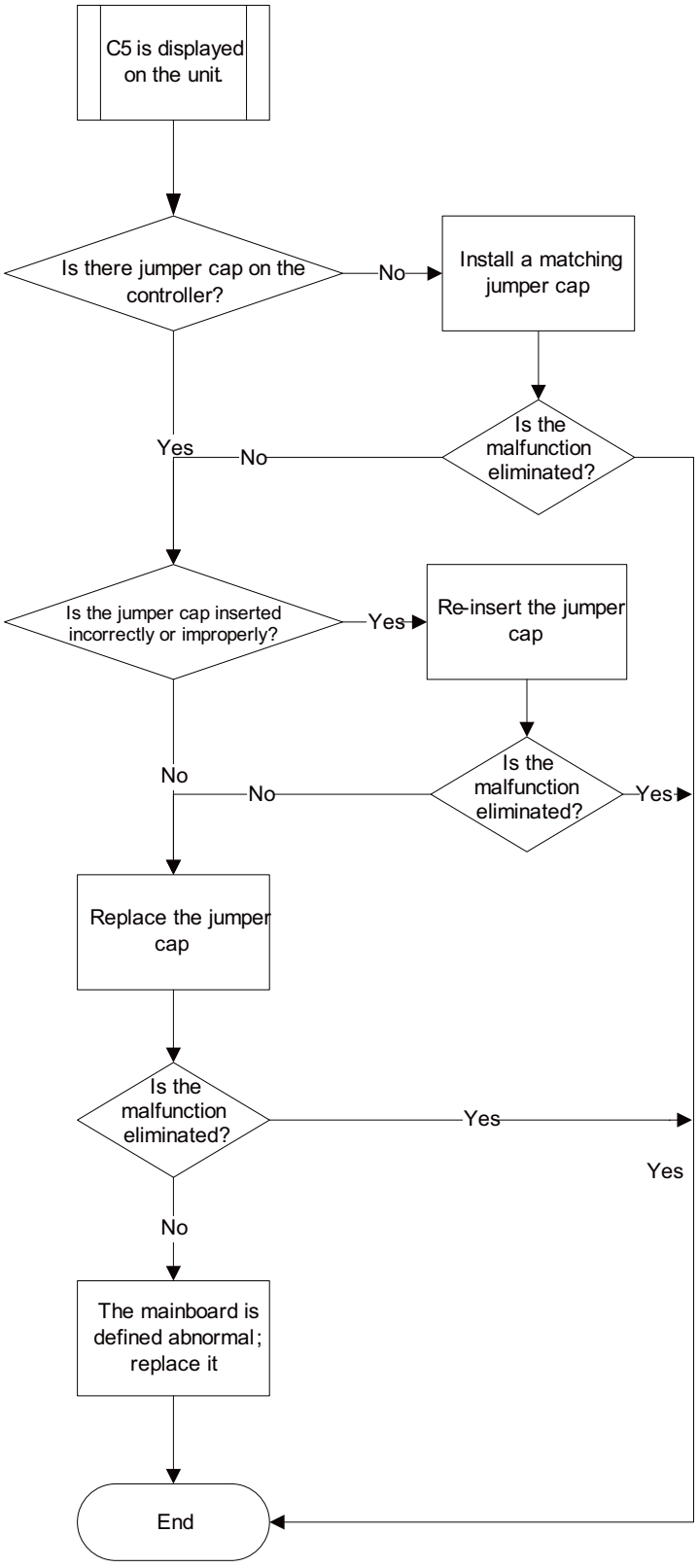
(1)Temperature sensor malfunction



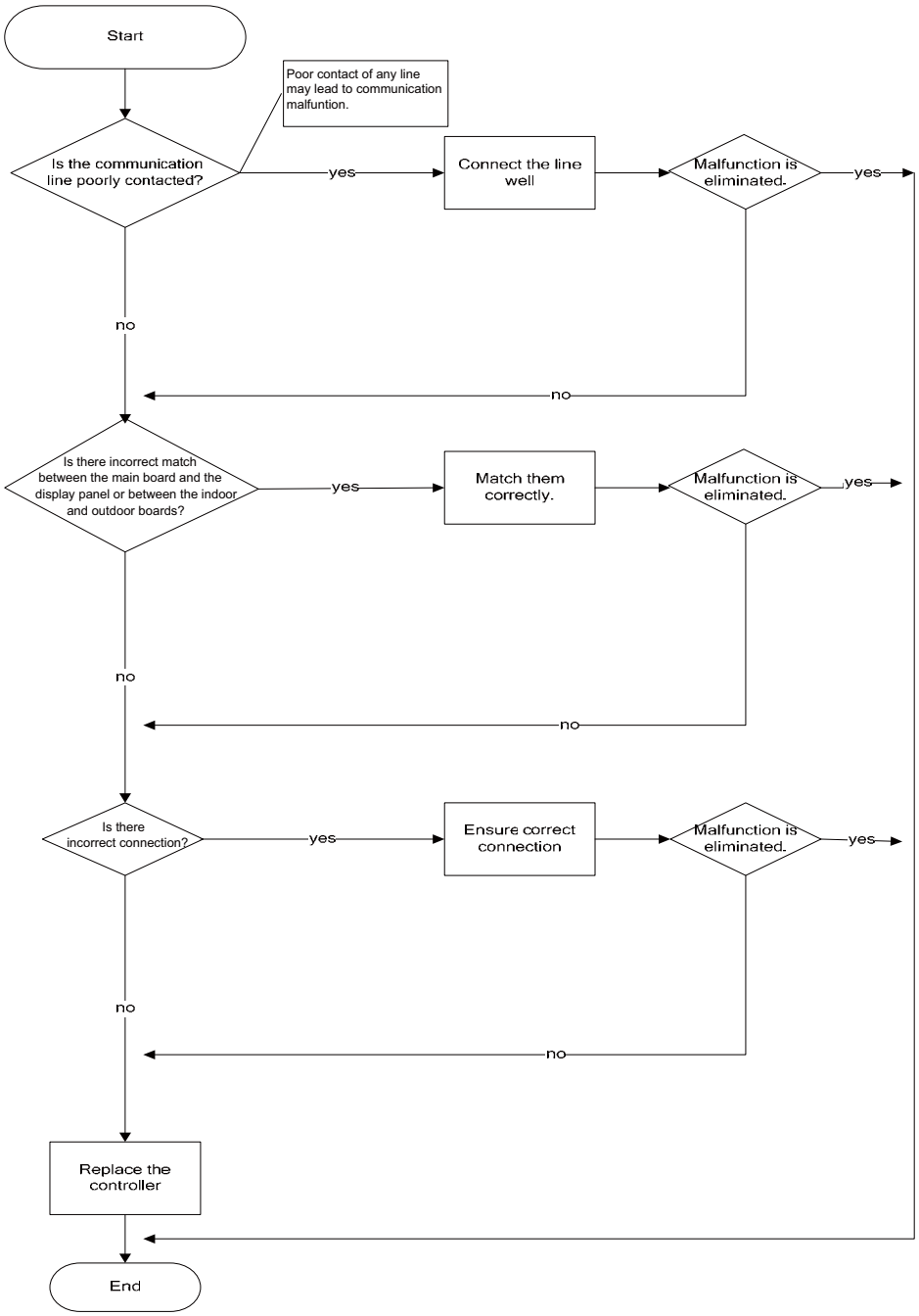
(2)Indoor fan does not operate (H6)


Start
Turn the fan blade under power off
The fan blade turns fluently
No
Adjust assembly of the motor and fan blade to make the fan blade turning fluently
Yes
No
Malfunction is eliminated
Check if the connection of internal fan motor and mainboard terminal is loosened
Yes
Reinsert the feedback terminal properly
No
Malfunction eliminated
Yes
No
Reenergized the unit, check if the voltage between red and black terminal of motor is 310VDC, within 1 minute during the louver is under operation
No
Mainboard malfunction, replace the mainboard with same model
Yes
Yes
No
Malfunction is eliminated
Yes
Check if the voltage between white and black terminal of motor is 15VDC within the next 1 minute
No
Mainboard malfunction replace the mainboard with same model
Yes
No
Malfunction is eliminated
Yes
Check if there's voltage signal between yellow and black terminal of motor within the next 1 minute
No
Mainboard malfunction replace the mainboard with same model
Yes
No
Malfunction is eliminated
Motor malfunction, replace the motor with same model
Yes
End

(3)Jumper cap malfunction (C5)

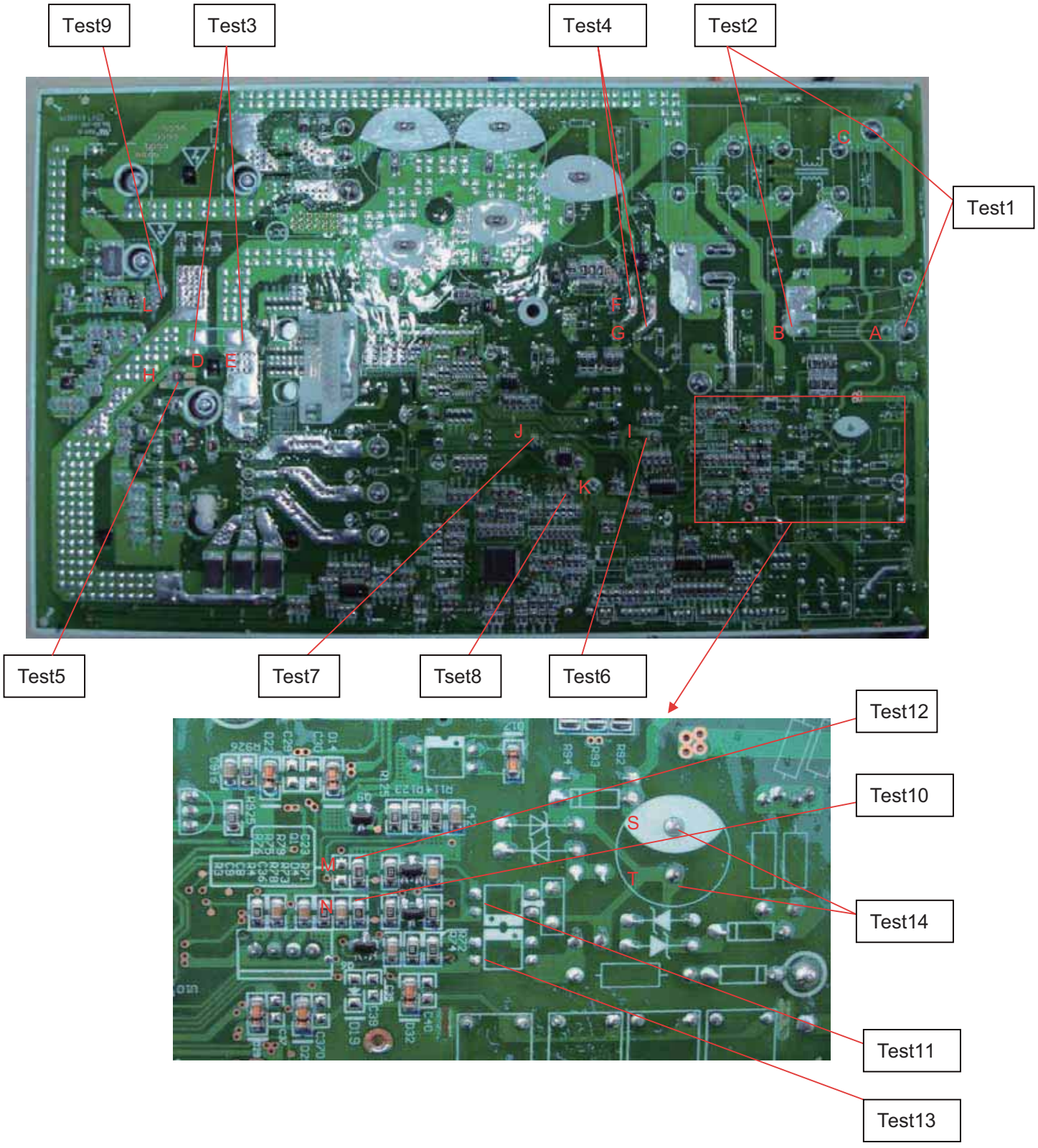


(4) Communication malfunction (E6)



4.2 Outdoor unit:

(1)Key detection point



Test NO	Test point	Corresponding component	Test value under normal condition
Test 1	Between A and C	Neutral and live wires	160V~265V
Test 2	Between B and C	Neutral and live wires	160V~265V
Test 3	Between D and E	DC busbar electrolytic capacitor	DC 180V~380V
Test 4	Between F and G	Electrolytic capacitor of power	DC 180V~380V
Test 5	Both ends of diode	D10(IPM module and 15V power supply)	DC 14.5V~15.6V
Test 6	Both ends of sheet capacitor C911	C911(12V power supply)	DC 12V~13V
Test 7	Both ends of sheet capacitor C914	C914(5V power supply)	DC 5V
Test 8	Both ends of sheet capacitor C83	C83(3.3V power supply)	DC 3.3V
Test 9	Both ends of sheet capacitor C912	C912(17V power supply)	DC 15V~18V
Test 10	Between point N and GND	Terminal N of R78 to earth(Outdoor unit signal receiver port)	Fluctuate between 0~3.3V
Test 11	U12	U12 leading feet(between 1 and 2)	Fluctuate between 0~3.3V
Test 12	Between point M and GND	Terminal M of R75 to earth(Outdoor unit signal sending port)	Fluctuate between 0~3.3V
Test 13	U15	U15 leading feet(between 3 and 4)	Fluctuate between 0~3.3V
Test 14	Between S and T	Communication circle power supply	DC 56V

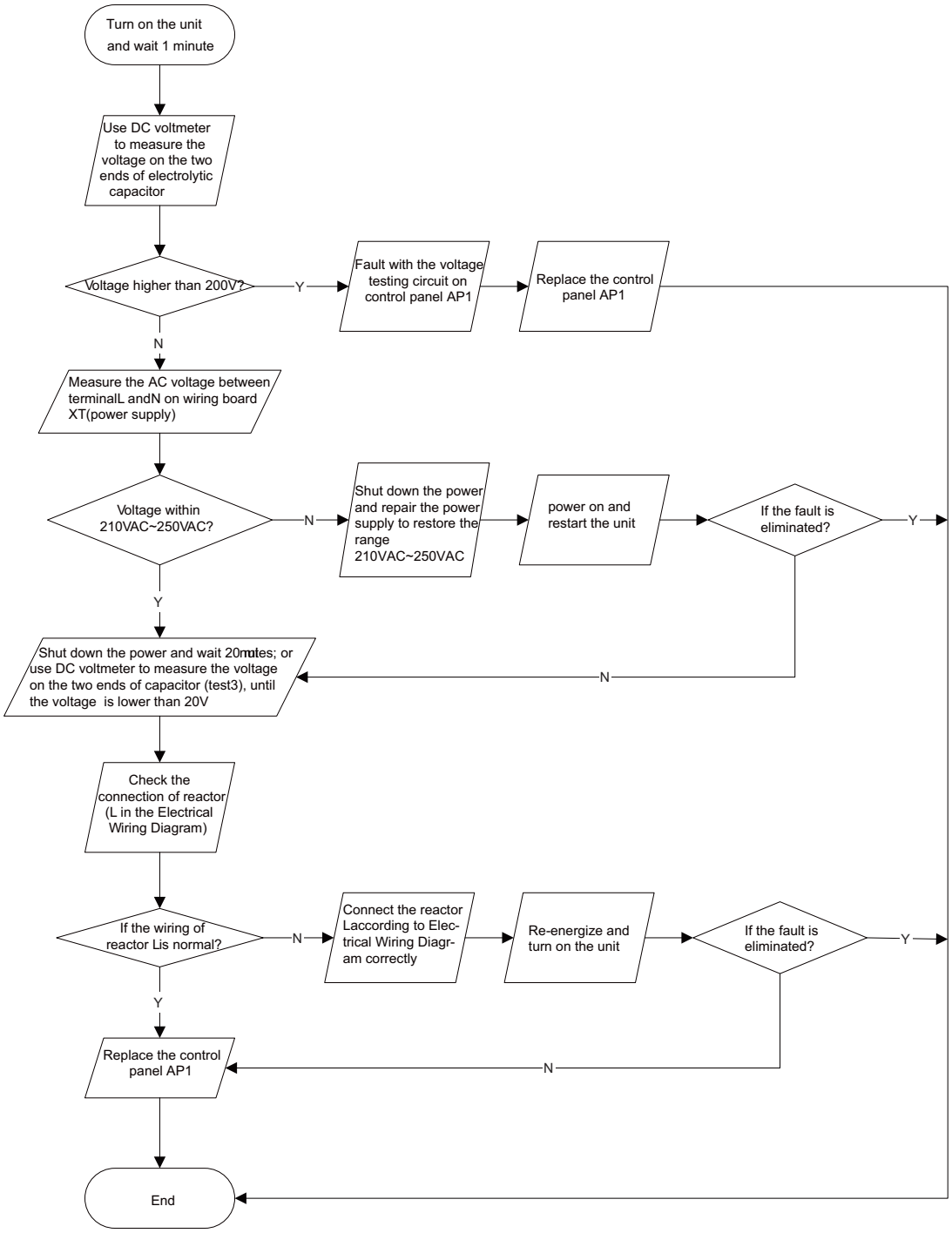
(2) Capacity charging malfunction (outdoor unit malfunction) (AP1 below is control board of outdoor unit)

Main detection point:

● Detect if the voltage of L and N terminal of wiring board is between 210AC-240AC by alternating voltage meter;

● Is reactor (L) well connected? Is connection wire loosened or pull-out? Is reactor (L) damaged?

Malfunction diagnosis process:


Turn on the unit and wait 1 minute
Use DC voltmeter to measure the voltage on the two ends of electrolytic capacitor
Voltage higher than 200V?
Y
Fault with the voltage testing circuit on control panel AP1
Replace the control panel AP1
N
Measure the AC voltage between terminalL andN on wiring board XT(power supply)
Voltage within 210VAC~250VAC?
N
Shut down the power and repair the power supply to restore the range 210VAC~250VAC
power on and restart the unit
If the fault is eliminated?
Y
Y
Shut down the power and wait 20minutes; or use DC voltmeter to measure the voltage on the two ends of capacitor (test3), until the voltage is lower than 20V
N
Check the connection of reactor (L in the Electrical Wiring Diagram)
If the wiring of reactor Lis normal?
N
Connect the reactor Laccording to Electrical Wiring Diagram correctly
Re-energize and turn on the unit
If the fault is eliminated?
Y
Y
Replace the control panel AP1
N
End

(3) IPM protection, desynchronizing malfunction, phase current of compressor is overcurrent (AP1 below is control board of outdoor unit)

Main detection point:

If control board AP1 and compressor COMP is well connected? If they are loosened? If the connection sequence is correct?

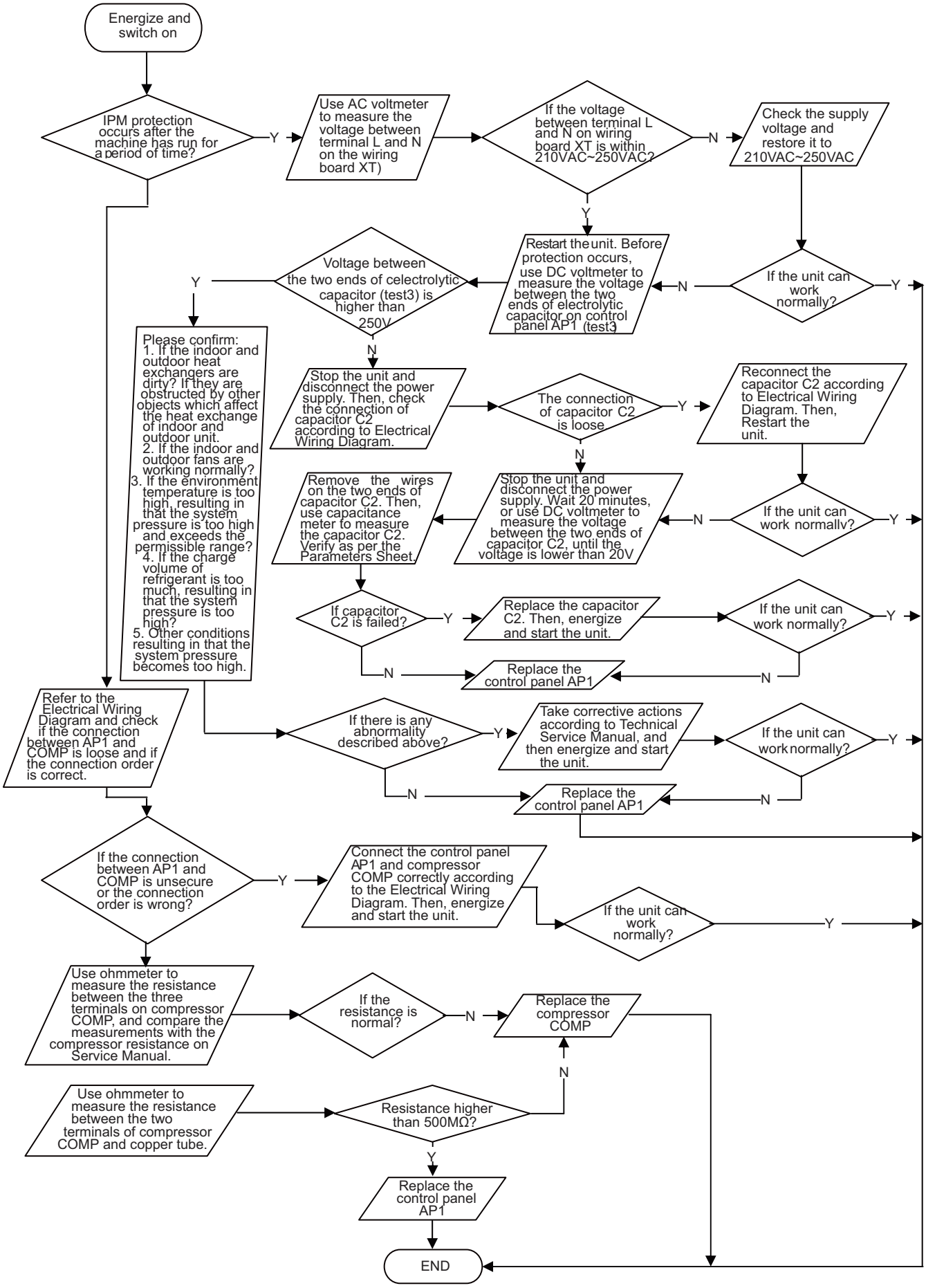
Is voltage input in the normal range (Test the voltage between L, N of wiring board XT by DC voltage meter)?

If coil resistance of compressor is normal? Is compressor coil insulating to copper pipe well?

If the work load of unit is heavy? If radiating of unit is well?

If the refrigerant charging is appropriate?

Malfunction diagnosis process:

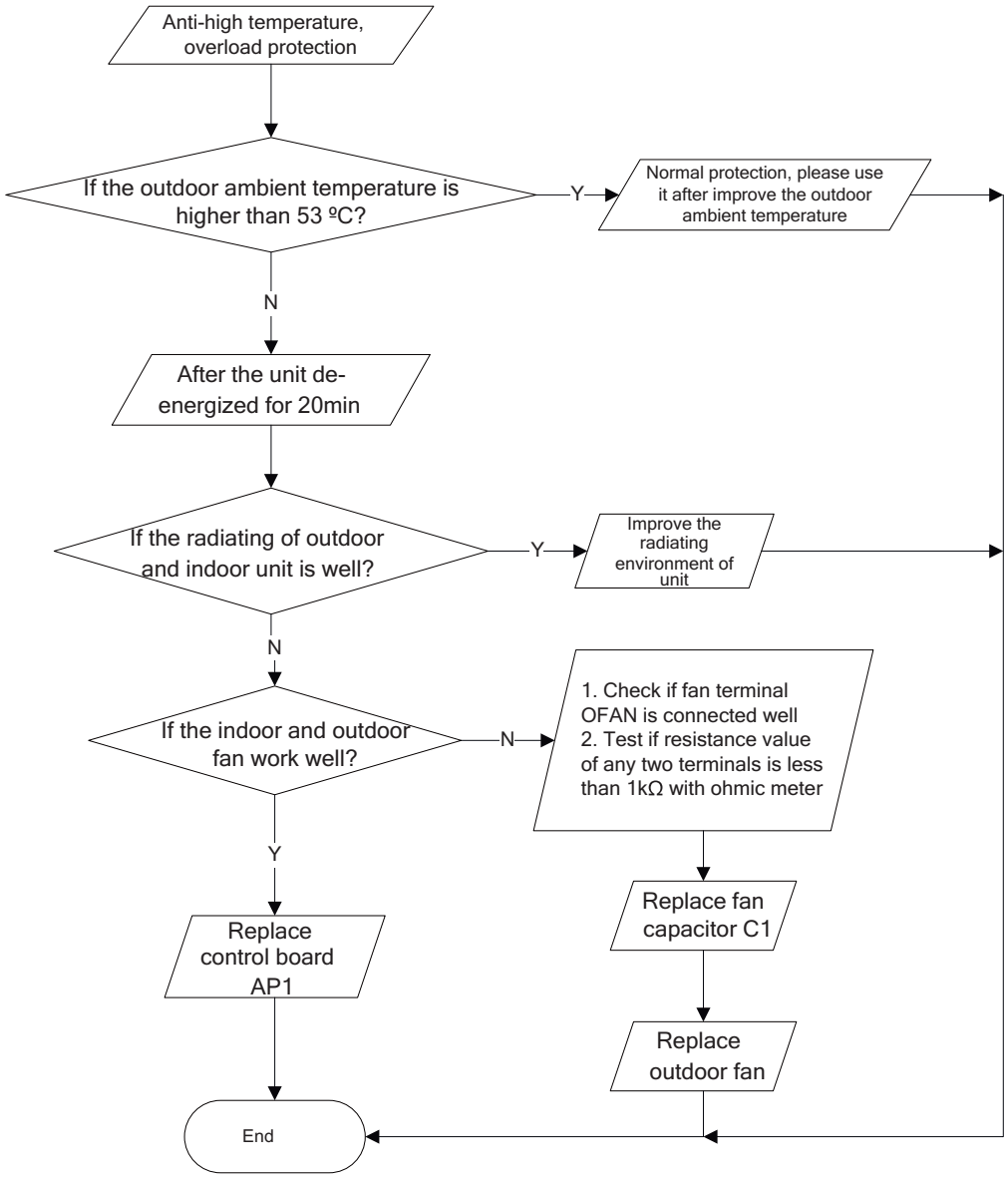

Energize and switch on
IPM protection occurs after the machine has run for a period of time?
Y
Use AC voltmeter to measure the voltage between terminal L and N on the wiring board XT)
If the voltage between terminal L and N on wiring board XT is within 210VAC~250VAC?
N
Check the supply voltage and restore it to 210VAC~250VAC
Y
Restart the unit. Before protection occurs, use DC voltmeter to measure the voltage between the two ends of electrolytic capacitor on control panel AP1 (test3
N
If the unit can work normally?
Y
Voltage between the two ends of celectrolytic capacitor (test3) is higher than 250V
Y
N
Please confirm:
1. If the indoor and outdoor heat exchangers are dirty? If they are obstructed by other objects which affect the heat exchange of indoor and outdoor unit.
2. If the indoor and outdoor fans are working normally?
3. If the environment temperature is too high, resulting in that the system pressure is too high and exceeds the permissible range?
4. If the charge volume of refrigerant is too much, resulting in that the system pressure is too high?
5. Other conditions resulting in that the system pressure becomes too high.
Stop the unit and disconnect the power supply. Then, check the connection of capacitor C2 according to Electrical Wiring Diagram.
The connection of capacitor C2 is loose
Y
Reconnect the capacitor C2 according to Electrical Wiring Diagram. Then, Restart the unit.
N
Remove the wires on the two ends of capacitor C2. Then, use capacitance meter to measure the capacitor C2. Verify as per the Parameters Sheet.
Stop the unit and disconnect the power supply. Wait 20 minutes, or use DC voltmeter to measure the voltage between the two ends of capacitor C2, until the voltage is lower than 20V
N
If the unit can work normallv?
Y
If capacitor C2 is failed?
Y
Replace the capacitor C2. Then, energize and start the unit.
If the unit can work normally?
Y
N
Replace the control panel AP1
N
Refer to the Electrical Wiring Diagram and check if the connection between AP1 and COMP is loose and if the connection order is correct.
If there is any abnormality described above?
Y
Take corrective actions according to Technical Service Manual, and then energize and start the unit.
If the unit can work normally?
Y
N
Replace the control panel AP1
N
If the connection between AP1 and COMP is unsecure or the connection order is wrong?
Y
Connect the control panel AP1 and compressor COMP correctly according to the Electrical Wiring Diagram. Then, energize and start the unit.
If the unit can work normally?
Y
Use ohmmeter to measure the resistance between the three terminals on compressor COMP, and compare the measurements with the compressor resistance on Service Manual.
If the resistance is normal?
N
Replace the compressor COMP
N
Use ohmmeter to measure the resistance between the two terminals of compressor COMP and copper tube.
Resistance higher than 500MΩ?
Y
Replace the control panel AP1
END

(4) Diagnosis for anti-high temperature, overload protection (AP1 below is control board of outdoor unit)

Main detection point:

- If the outdoor ambient temperature is in normal range;
- If the indoor and outdoor fan is running normal;
- If the radiating environment of indoor and outdoor unit is well.

Malfunction diagnosis process:

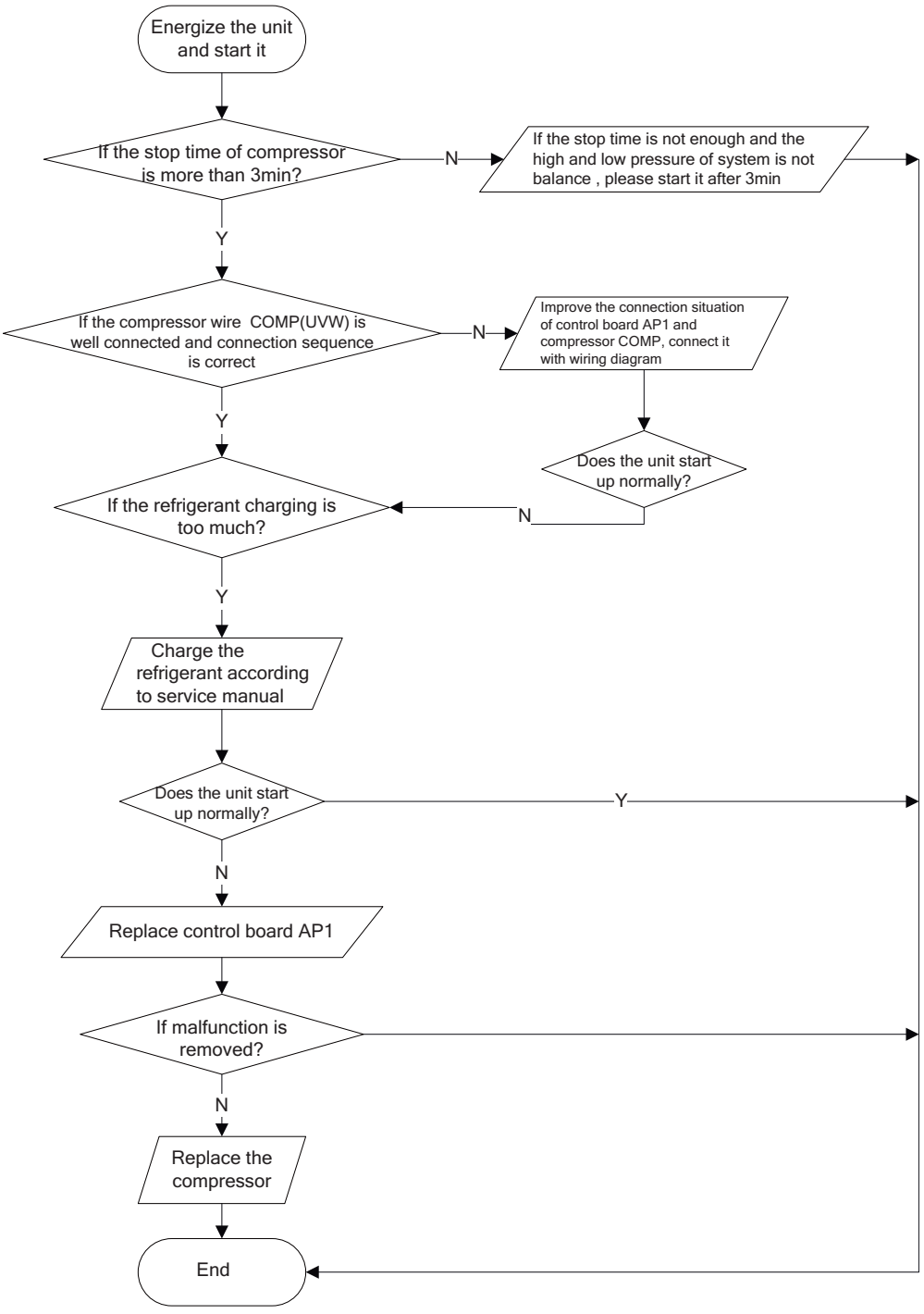

Anti-high temperature, overload protection
If the outdoor ambient temperature is higher than 53 ºC?
Y
Normal protection, please use it after improve the outdoor ambient temperature
N
After the unit de-energized for 20min
If the radiating of outdoor and indoor unit is well?
Y
Improve the radiating environment of unit
N
If the indoor and outdoor fan work well?
N
1. Check if fan terminal OFAN is connected well
2. Test if resistance value of any two terminals is less than 1kΩ with ohmic meter
Y
Replace control board AP1
Replace fan capacitor C1
Replace outdoor fan
End

(5) Diagnosis for failure start up malfunction (AP1 below is control board of outdoor unit)

Main detection point:

- If the compressor wiring is correct?
- If the stop time of compressor is enough?
- If the compressor is damaged?
- If the refrigerant charging is too much?

Malfunction diagnosis process:

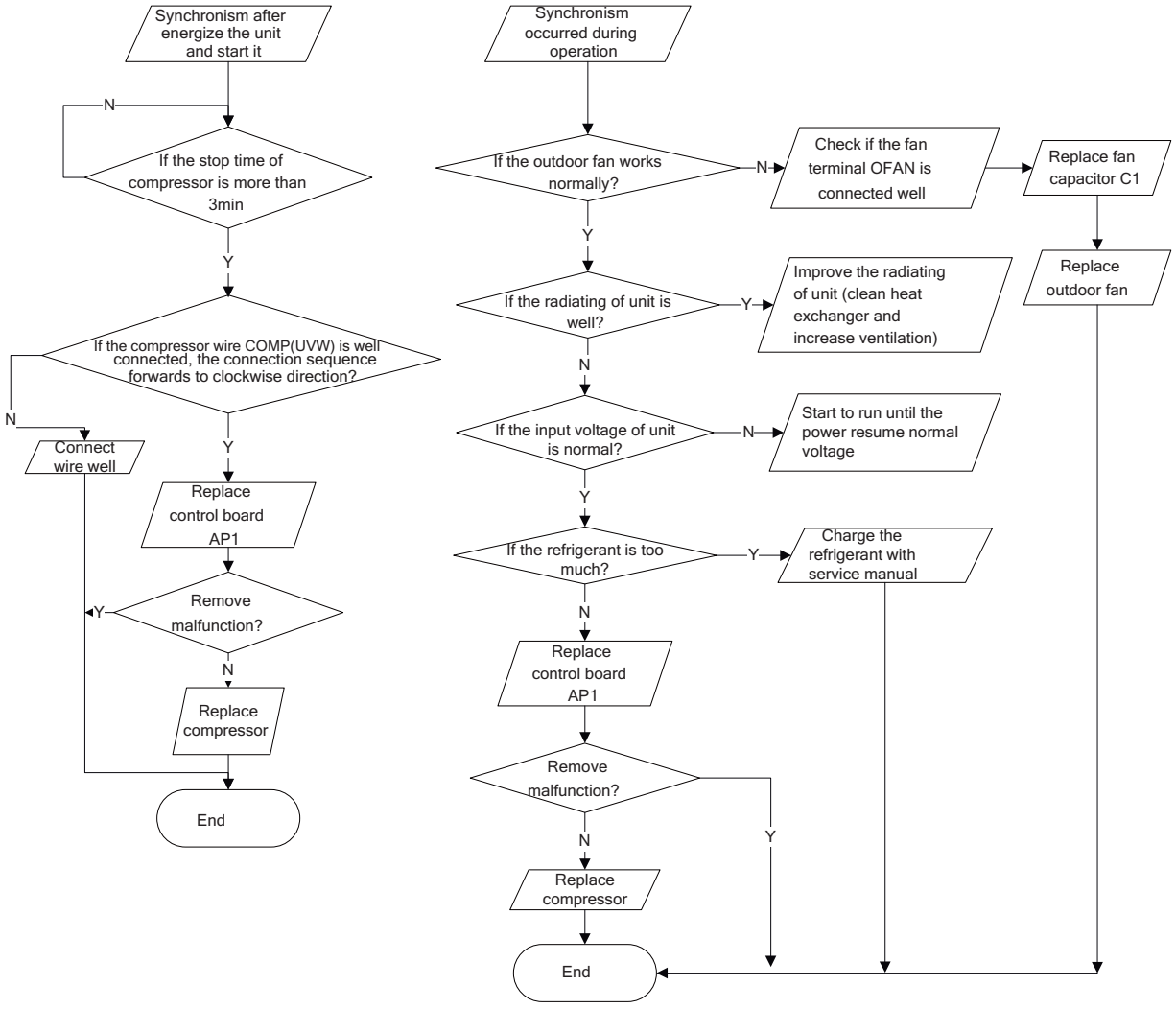

Energize the unit and start it
If the stop time of compressor is more than 3min?
N
If the stop time is not enough and the high and low pressure of system is not balance , please start it after 3min
Y
If the compressor wire COMP(UVW) is well connected and connection sequence is correct
N
Improve the connection situation of control board AP1 and compressor COMP, connect it with wiring diagram
Y
Does the unit start up normally?
If the refrigerant charging is too much?
N
Y
Charge the refrigerant according to service manual
Does the unit start up normally?
Y
N
Replace control board AP1
If malfunction is removed?
N
Replace the compressor
End

(6) Diagnosis for compressor synchronism (AP1 below is control board of outdoor unit)

Main detection point:

- If the system pressure is over-high?
- If the work voltage is over-low?

Malfunction diagnosis process:

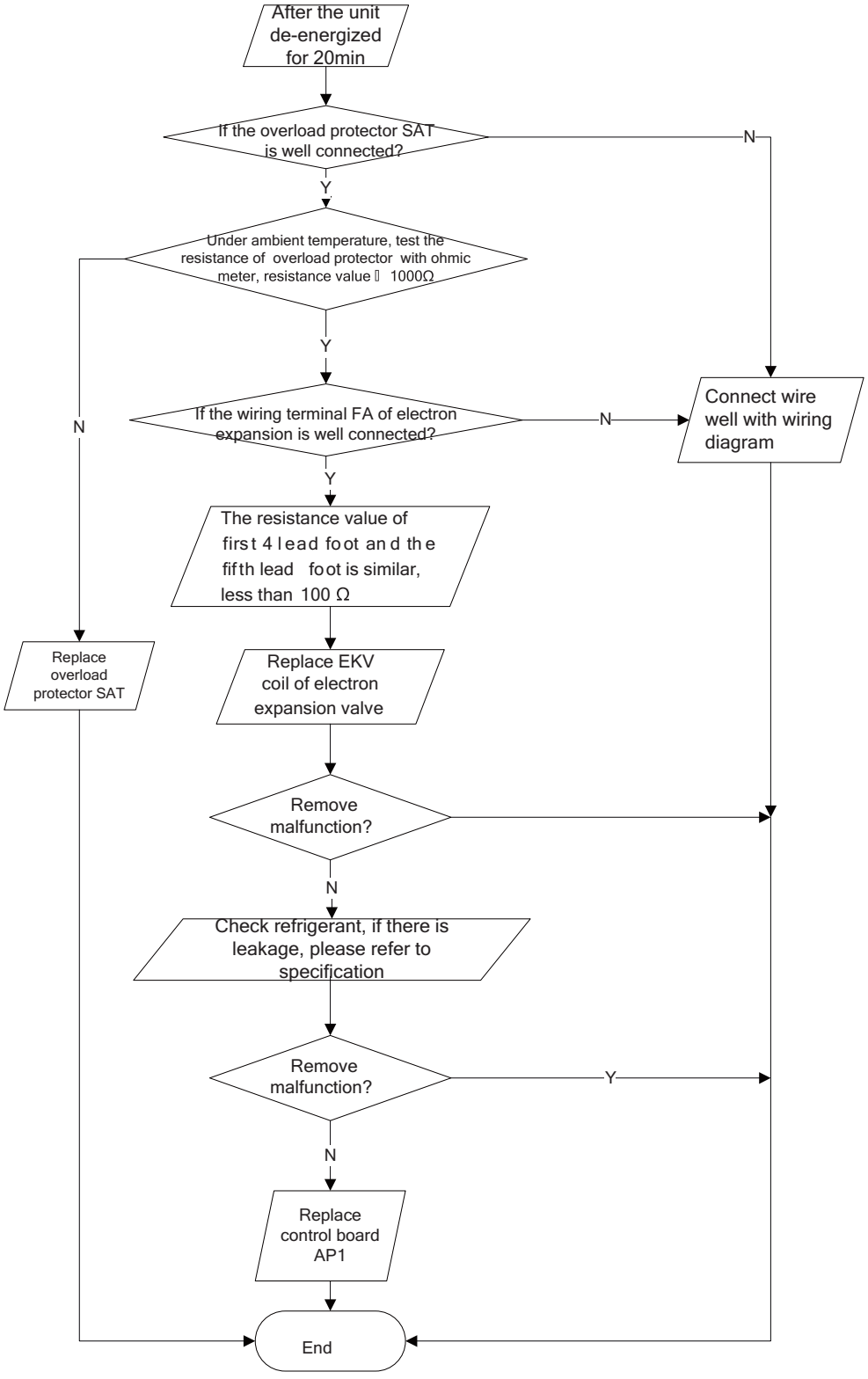


(7) Diagnosis for overload and discharge malfunction (AP1 below is control board of outdoor unit)

Main detection point:

- If the electron expansion valve is connected well? Is the expansion valve damaged?
- If the refrigerant is leakage?
- If the overload protector is damaged?

Malfunction diagnosis process:

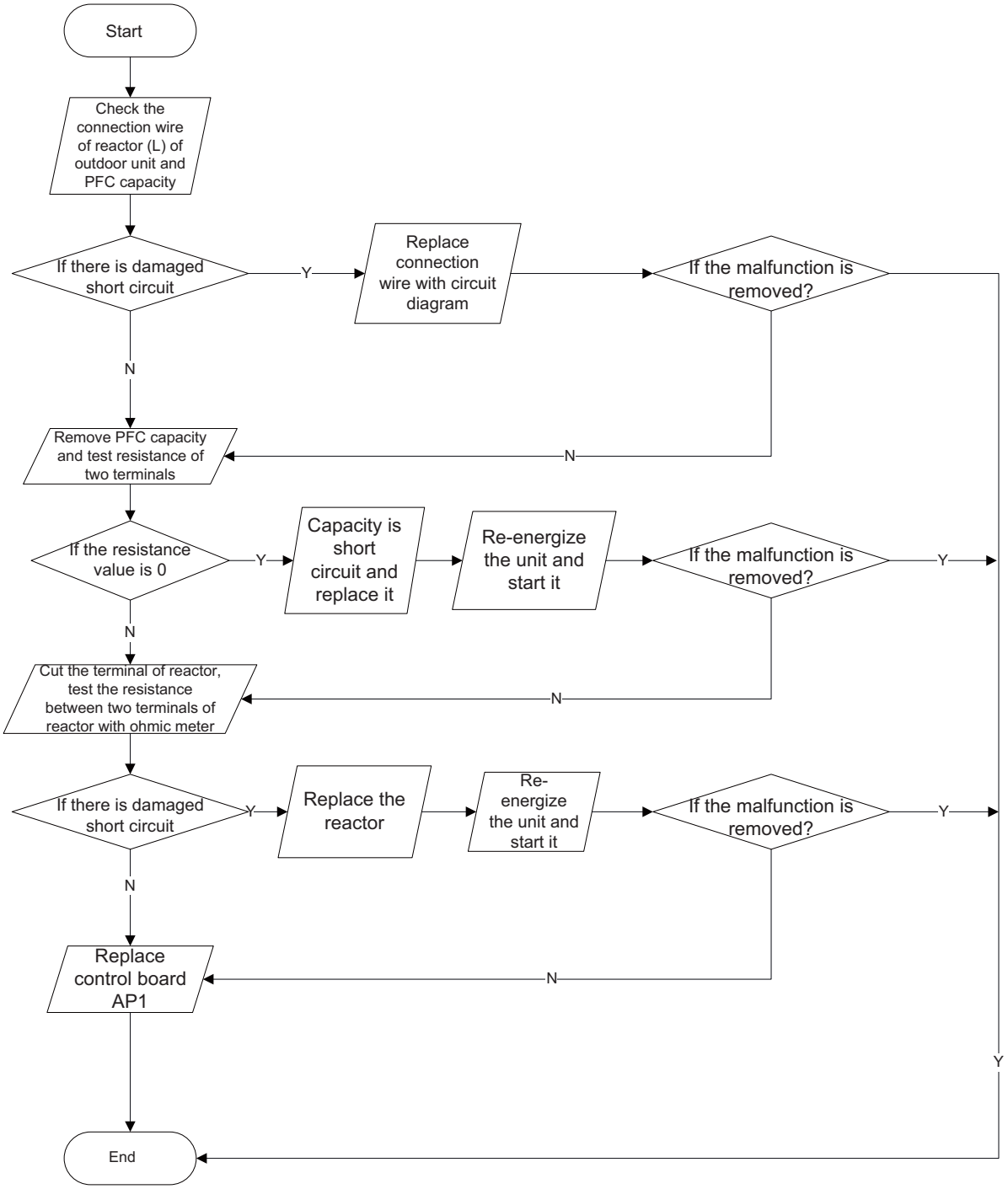

After the unit de-energized for 20min
If the overload protector SAT is well connected?
N
Y
Under ambient temperature, test the resistance of overload protector with ohmic meter, resistance value 1000Ω
Y
If the wiring terminal FA of electron expansion is well connected?
N
Connect wire well with wiring diagram
N
Y
The resistance value of first 4 lead foot and the fifth lead foot is similar, less than 100 Ω
Replace overload protector SAT
Replace EKV coil of electron expansion valve
Remove malfunction?
N
Check refrigerant, if there is leakage, please refer to specification
Remove malfunction?
Y
N
Replace control board AP1
End

(8) PFC (correction for power factor) malfunction (outdoor unit malfunction) (AP1 below is control board of outdoor unit)

Main detection point:

● Check if reactor (L) of outdoor unit and PFC capacity are damaged.

Malfunction diagnosis process:


Start
Check the connection wire of reactor (L) of outdoor unit and PFC capacity
If there is damaged short circuit
Y
Replace connection wire with circuit diagram
If the malfunction is removed?
N
Remove PFC capacity and test resistance of two terminals
N
If the resistance value is 0
Y
Capacity is short circuit and replace it
Re-energize the unit and start it
If the malfunction is removed?
Y
N
Cut the terminal of reactor, test the resistance between two terminals of reactor with ohmic meter
N
If there is damaged short circuit
Y
Replace the reactor
Re-energize the unit and start it
If the malfunction is removed?
Y
N
Replace control board AP1
N
Y
End

(9) Communication malfunction (AP1 below is control board of outdoor unit)

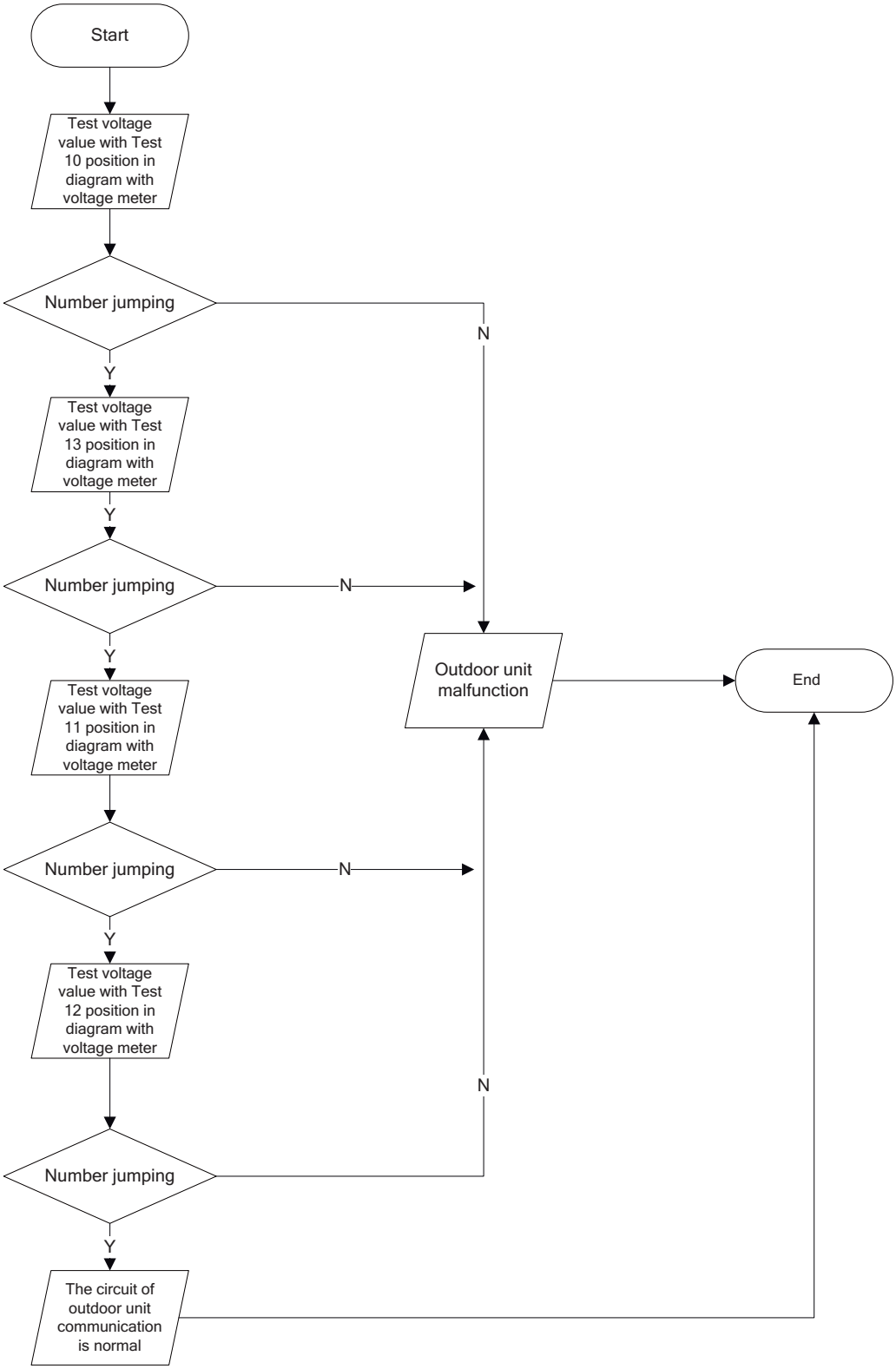
Main detection point:

● Check if the connection wire and the built-in wiring of indoor and outdoor unit is connected well and no damaged;

● If the communication circuit of indoor mainboard is damaged? If the communication circuit of outdoor mainboard (AP1) is damaged

Malfunction diagnosis process:

(10) Diagnosis process for outdoor communication circuit:



Appendix 1: Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units(15K)

Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)
-19	138.1		20	18.75		59	3.848		98	1.071
-18	128.6		21	17.93		60	3.711		99	1.039
-17	121.6		22	17.14		61	3.579		100	1.009
-16	115		23	16.39		62	3.454		101	0.98
-15	108.7		24	15.68		63	3.333		102	0.952
-14	102.9		25	15		64	3.217		103	0.925
-13	97.4		26	14.36		65	3.105		104	0.898
-12	92.22		27	13.74		66	2.998		105	0.873
-11	87.35		28	13.16		67	2.896		106	0.848
-10	82.75		29	12.6		68	2.797		107	0.825
-9	78.43		30	12.07		69	2.702		108	0.802
-8	74.35		31	11.57		70	2.611		109	0.779
-7	70.5		32	11.09		71	2.523		110	0.758
-6	66.88		33	10.63		72	2.439		111	0.737
-5	63.46		34	10.2		73	2.358		112	0.717
-4	60.23		35	9.779		74	2.28		113	0.697
-3	57.18		36	9.382		75	2.206		114	0.678
-2	54.31		37	9.003		76	2.133		115	0.66
-1	51.59		38	8.642		77	2.064		116	0.642
0	49.02		39	8.297		78	1.997		117	0.625
1	46.6		40	7.967		79	1.933		118	0.608
2	44.31		41	7.653		80	1.871		119	0.592
3	42.14		42	7.352		81	1.811		120	0.577
4	40.09		43	7.065		82	1.754		121	0.561
5	38.15		44	6.791		83	1.699		122	0.547
6	36.32		45	6.529		84	1.645		123	0.532
7	34.58		46	6.278		85	1.594		124	0.519
8	32.94		47	6.038		86	1.544		125	0.505
9	31.38		48	5.809		87	1.497		126	0.492
10	29.9		49	5.589		88	1.451		127	0.48
11	28.51		50	5.379		89	1.408		128	0.467
12	27.18		51	5.197		90	1.363		129	0.456
13	25.92		52	4.986		91	1.322		130	0.444
14	24.73		53	4.802		92	1.282		131	0.433
15	23.6		54	4.625		93	1.244		132	0.422
16	22.53		55	4.456		94	1.207		133	0.412
17	21.51		56	4.294		95	1.171		134	0.401
18	20.54		57	4.139		96	1.136		135	0.391
19	19.63		58	3.99		97	1.103		136	0.382

Appendix 2: Resistance Table of Outdoor and Indoor Tube Temperature Sensors(20K)

Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)
-19	181.4		20	25.01		59	5.13		98	1.427
-18	171.4		21	23.9		60	4.948		99	1.386
-17	162.1		22	22.85		61	4.773		100	1.346
-16	153.3		23	21.85		62	4.605		101	1.307
-15	145		24	20.9		63	4.443		102	1.269
-14	137.2		25	20		64	4.289		103	1.233
-13	129.9		26	19.14		65	4.14		104	1.198
-12	123		27	18.13		66	3.998		105	1.164
-11	116.5		28	17.55		67	3.861		106	1.131
-10	110.3		29	16.8		68	3.729		107	1.099
-9	104.6		30	16.1		69	3.603		108	1.069
-8	99.13		31	15.43		70	3.481		109	1.039
-7	94		32	14.79		71	3.364		110	1.01
-6	89.17		33	14.18		72	3.252		111	0.983
-5	84.61		34	13.59		73	3.144		112	0.956
-4	80.31		35	13.04		74	3.04		113	0.93
-3	76.24		36	12.51		75	2.94		114	0.904
-2	72.41		37	12		76	2.844		115	0.88
-1	68.79		38	11.52		77	2.752		116	0.856
0	65.37		39	11.06		78	2.663		117	0.833
1	62.13		40	10.62		79	2.577		118	0.811
2	59.08		41	10.2		80	2.495		119	0.77
3	56.19		42	9.803		81	2.415		120	0.769
4	53.46		43	9.42		82	2.339		121	0.746
5	50.87		44	9.054		83	2.265		122	0.729
6	48.42		45	8.705		84	2.194		123	0.71
7	46.11		46	8.37		85	2.125		124	0.692
8	43.92		47	8.051		86	2.059		125	0.674
9	41.84		48	7.745		87	1.996		126	0.658
10	39.87		49	7.453		88	1.934		127	0.64
11	38.01		50	7.173		89	1.875		128	0.623
12	36.24		51	6.905		90	1.818		129	0.607
13	34.57		52	6.648		91	1.736		130	0.592
14	32.98		53	6.403		92	1.71		131	0.577
15	31.47		54	6.167		93	1.658		132	0.563
16	30.04		55	5.942		94	1.609		133	0.549
17	28.68		56	5.726		95	1.561		134	0.535
18	27.39		57	5.519		96	1.515		135	0.521
19	26.17		58	5.32		97	1.47		136	0.509

Appendix3: Resistance Table for Outdoor Discharge Temperature Sensor (50K)

Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)		Temp(℃)	Resistance(kΩ)
-29	853.5		10	98		49	18.34		88	4.75
-28	799.8		11	93.42		50	17.65		89	4.61
-27	750		12	89.07		51	16.99		90	4.47
-26	703.8		13	84.95		52	16.36		91	4.33
-25	660.8		14	81.05		53	15.75		92	4.20
-24	620.8		15	77.35		54	15.17		93	4.08
-23	580.6		16	73.83		55	14.62		94	3.96
-22	548.9		17	70.5		56	14.09		95	3.84
-21	516.6		18	67.34		57	13.58		96	3.73
-20	486.5		19	64.33		58	13.09		97	3.62
-19	458.3		20	61.48		59	12.62		98	3.51
-18	432		21	58.77		60	12.17		99	3.41
-17	407.4		22	56.19		61	11.74		100	3.32
-16	384.5		23	53.74		62	11.32		101	3.22
-15	362.9		24	51.41		63	10.93		102	3.13
-14	342.8		25	49.19		64	10.54		103	3.04
-13	323.9		26	47.08		65	10.18		104	2.96
-12	306.2		27	45.07		66	9.83		105	2.87
-11	289.6		28	43.16		67	9.49		106	2.79
-10	274		29	41.34		68	9.17		107	2.72
-9	259.3		30	39.61		69	8.85		108	2.64
-8	245.6		31	37.96		70	8.56		109	2.57
-7	232.6		32	36.38		71	8.27		110	2.50
-6	220.5		33	34.88		72	7.99		111	2.43
-5	209		34	33.45		73	7.73		112	2.37
-4	198.3		35	32.09		74	7.47		113	2.30
-3	199.1		36	30.79		75	7.22		114	2.24
-2	178.5		37	29.54		76	7.00		115	2.18
-1	169.5		38	28.36		77	6.76		116	2.12
0	161		39	27.23		78	6.54		117	2.07
1	153		40	26.15		79	6.33		118	2.02
2	145.4		41	25.11		80	6.13		119	1.96
3	138.3		42	24.13		81	5.93		120	1.91
4	131.5		43	23.19		82	5.75		121	1.86
5	125.1		44	22.29		83	5.57		122	1.82
6	119.1		45	21.43		84	5.39		123	1.77
7	113.4		46	20.6		85	5.22		124	1.73
8	108		47	19.81		86	5.06		125	1.68
9	102.8		48	19.06		87	4.90		126	1.64

Note: The information above is for reference only.